California Health Information Exchange Strategic and Operational Plan

June 2012

TABLE OF CONTENTS

Preface

California is at a very exciting point in the execution of health information exchange (HIE) program planning and execution.

Significant education and awareness of the need for HIE to influence care reform and cost management of care to California's residents has occurred since the initial strategic and operational plan was developed in 2009. This awareness, coupled with ongoing state and federal health care reform discussion, has brought new understanding of the core role of electronic health information exchange in future health care related transactions, whether for payment, quality or direct care purposes.

We've learned many valuable lessons since the initial Operational and Strategic Plans were drafted in 2009. Since that time the most significant areas of change have been in governance (Section 1.1), sustainability (Section 3.0), and Privacy and Security Framework (Section 5.0). These changes, and the lessons we've learned, are reflected in this updated document, which is submitted for your review and approval.

This document is submitted at a time when the programmatic work specific to HIE is "in transition," with the full acknowledgement that descriptive and budget addendums will be required as planning is finalized to move HIE programs from California's former Partner, Cal eConnect (CeC), to the future Partner, The Institute for Population Health Improvement, University of California Davis Health System, under the direction of Distinguished Professor and Director, Kenneth Kizer, MD, MPH.

The inaugural efforts of governance — as evidenced by the state governance entity (SGE), Cal eConnect (CeC) — with a statutorily defined 20+ member Board of Directors proved to be too constraining and cumbersome a model to support a start-up organization tasked with aggressive implementation and planning in a large geographical environment. This realization, and the subsequent termination by CeC of its SGE subgrantee status arrangement, has provided an opportunity to reenergize and refine programmatic work while focusing on future modeling and sustainability.

The focus on electronic data availability has been expanded through California's state government planning and supporting structures, as recently addressed in the "Let's Get Healthy California" efforts focusing on 10-year planning for population management of high-risk, high cost chronic diseases and in the creation of the Chief Medical Information Officer in the Department of Health Care Services, Medi-Cal. The new position highlights California's commitment to a data driven, analytical approach to the use of information to implement and monitor improvements in Medi-Cal efforts.

It is important for the reader to understand the use of specific terms throughout this document. Specifically:

- California Health and Human Services Agency will be defined as *Agency*, the state entity in receipt of federal funding to facilitate HIE under the American Recovery and Reinvestment Act.
- "*Former Partner*" will refer to Cal eConnect
- "*Future Partner*" will reference The Institute for Population Health Improvement, UC Davis Health System
- Health information exchange organization (HIO) is commonly used in this document to define the entity with ***governance structure and oversight*** in health information exchange.
- Health information service partner (HISP) as used in California refers to ***any*** service partner engaged by a Health Information Exchange Organization to facilitate exchange. Note: This is a use that differs from the definition in common use by our federal partners where it is specific to NwHIN Direct facilitation.

California's statewide efforts in HIE are truly "a work in progress" and will remain that way for the foreseeable future. This is to be expected as HIE is a tool to support providers and hospitals in the pursuit of efforts to attain meaningful use. Patients are also more engaged and empowered through information access and seek more active participation in management of their own health status. Government, in its ability to both manage and oversee population health, will better manage the costs of care that is effective, efficient, and financially viable.

Much dialogue, debate, consensus, and the "agreement to disagree" have taken place across the country regarding Health Information Technology (HIT). Stimulated by funding through The American Recovery and Reinvestment Act (ARRA) and its Health Information Technology for Economic and Clinical Health (HITECH) Act, this discussion centers on a central question: **How do we best apply HIT and Health Information Exchange (HIE) technology to solve broad healthcare challenges?**

Nowhere have the conversations been more robust than in California.

California is geographically a large diverse state, with densely populated urban areas like Los Angeles and San Francisco and wide-open spaces such as Monterey and the Central Coast — and everything in between. This huge range of diversity also creates a complicated and divided technology landscape. In this way, California is truly a microcosm of the entire United States, reflecting the diverse technology challenges we face nationwide.

The state's diversity is most apparent when implementing and applying technology. On the one hand, California is nationally recognized for technology leadership in the Silicon Valley, a highly advanced entrepreneurial spirit, and a technological vision renowned as "leading edge." California is home to the most sophisticated health care institutions in the world; these providers have invested billions of dollars in health IT to support improvements in efficiency and quality, both within their individual organizations and in their patient populations. Additionally, emerging health information exchange organizations (HIOs) are on the forefront of interoperability, endeavoring to support community health care and improve care for the underserved. And state government has made significant investments in systems including Medi-Cal and various state registries that can be leveraged to create value in healthcare settings.

On the other hand, many of California's rural areas[1] don't have access to broadband. The result? A growing "digital divide."

What has created this divide? We can look to California's geographic landscape for answers. Eighty percent of California landmass is designated as rural. [2] As recently as 2008, 57% of households in rural areas remained without

[1] US Census Bureau, Definition of Urban and Rural, October 1995. Rural: all territory, population, and housing units that are located outside of urban areas and urban clusters. Urban areas and clusters are determined by population density and size.

[2] Sam Willburn, Department of HealthCare Services, *State Affairs Update*, The California State Rural Health Association 9th Annual Rural Health Conference, Sacramento, CA , November 19, 2009.

broadband access[3]. Thirteen percent of California's 37 million residents (5.1 million) live in these rural areas[4] and are cared for by providers whose patient load is over twice that of their counterparts in non-rural areas (935 to 460 per doctor, respectively).[5]

This "care divide" is exacerbated by the shortage of physicians in rural areas nationally: only one in four doctors practice in these areas.[6]

California is dedicated to bridging this divide. In spite of the differences in geography, technology access, and adoption, a private-public-government commitment to the advancement of technological solutions exists. The goal is to eliminate barriers, increase safety and quality, and reduce cost while actively engaging patients in the care process. When it comes to statewide comprehensive health care reform efforts, health information available electronically through HIE continues to figure prominently in ongoing planning.

Our state has a documented commitment to eHealth. For example, the "Let's Get Healthy California" initiative, an Executive Order signed by Governor Edmund G. Brown on May 3, 2012, will focus on "develop(ment of) a 10-year plan for improving the health of Californians, controlling health care costs, promoting personal responsibility for individual health and advancing health equity by establishing baselines for key health indications" through "the talent, resources, experience and innovations of California's….technology and healthcare industries, universities and others".

Movement toward this goal began in March 2007 with Governor Arnold Schwarzenegger's Executive Order S-06-07, which called for the advancement of statewide health IT adoption to increase quality, strengthen transparency, and promote accountability in the health care sector. The order called for "100 percent electronic health data exchange" within ten years, and it identified key actions for the state to pursue, including providing state leadership, leveraging state purchasing power, developing a quality reporting mechanism through the Office of the Patient Advocate, and strengthening the ability of the Office of Statewide Health Planning and Development to collect, integrate, and distribute data.

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[3] The California Broadband Task Force, *The State of Connectivity: Building Innovation Through Connectivity*, January 2008

[4] USDA: Economic Research Service, *State Fact Sheets*, December 9, 2009

[5] California Health Interview Survey, *Diabetes and Health Disease search; rural/urban comparison*, 2007

[6] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2012-13 Edition*, Physicians and Surgeons, on the Internet at http://www.bls.gov/ooh/healthcare/physicians-and-surgeons.htm (visited *May 31, 2012)*

Many positive changes have already begun: A newly created position within Medi-Cal leadership, the first Chief Medical Information Officer, will be staffed by the former interim Deputy Secretary, HIE, and will focus on applying data in Medi-Cal's rich repository of information to these efforts. The Officer will coordinate information provided through administrative data and quality reporting to provide analytics for decision making and educational efforts focused on reduction and prevention of chronic disease management.

California Health and Human Services (Agency) is the ARRA-funded HIE grantee, under the direction of the Deputy Secretary, HIE and in new HIE cooperative partnership agreement with the UC Davis Medical Center's Institute for Population Health Improvement (IPHI), known throughout the following document as "the Partner." Together, these groups and individuals will work in concert to continue leveraging federal dollars with statewide partners, funding, and planning opportunities for advancing HIE in California.

The collective efforts of federal, state, and stakeholders, including patients, will create a model environment for HIE, improving both the physical and fiscal health of our state. To this end, we've simplified the Vision and Goals of California's e-Health landscape:

California's Vision

Improve the health and well-being of all Californians.

California's e-Goals

- *Enhance* individual and population health outcomes through results-oriented programs.
- *Ensure* secure data access that protects patient privacy and data integrity.
- *Engage* patients and families as partners in care.

1.1 Oversight and Governance

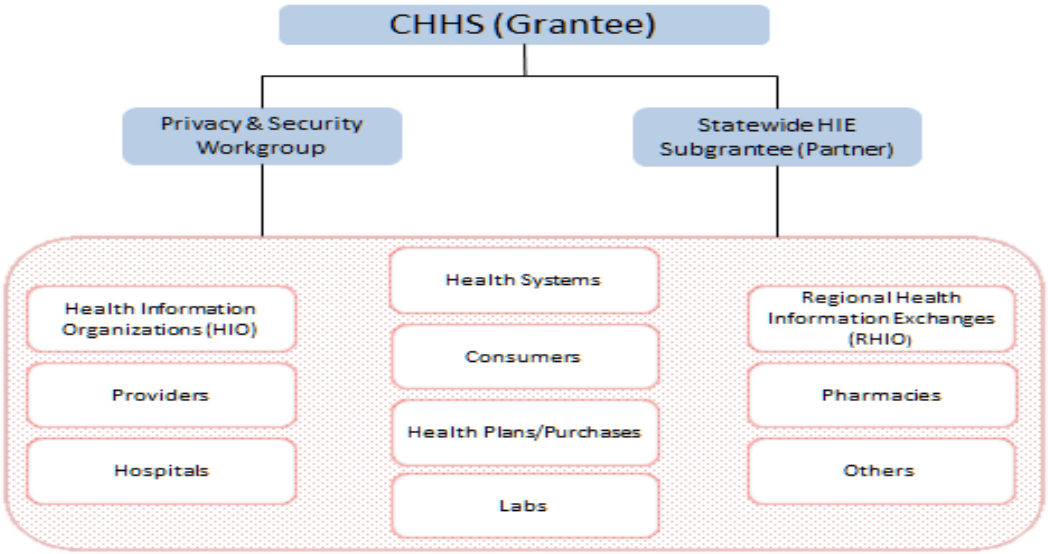
California's Health Information Exchange (HIE) strategy has engaged a diverse number of stakeholders who are all driven by the same passion — improving the health and well-being of our citizens.

The HITECH Act includes state grants to promote health information technology and health information exchange. Through the state Health Information Exchange (HIE) Cooperative Agreement Program, grants have been awarded to States to develop and advance mechanisms for information sharing across the health care system. California Health and Human Services Agency ("Agency") is the grantee for California, and has not appointed a State Designated Entity (SDE). Agency is expected to develop a strategic plan and use their authority and resources to:

- Develop and implement up-to-date privacy and security requirements for HIE.
- Develop technical services to enable interoperability within and across states.
- Coordinate with Medicaid and state public health programs to enable information exchange and support monitoring of provider participation in HIE.
- Remove barriers that may hinder effective HIE, particularly those related to interoperability across pharmacies, laboratories, hospitals, clinician offices, health plans, and other health information exchange partners.
- Ensure an effective model for HIE governance and accountability is in place.
- Convene health care stakeholders to build trust in and support for a statewide approach to HIE.

The diagram below shows the relationship between the state, the statewide HIE subgrantee ("Partner"), the Privacy and Security Workgroups, and stakeholders:

FIGURE 1. CALIFORNIA HIE RELATIONSHIPS



1.1.1 CALIFORNIA E-HEALTH COORDINATING COMMITTEE

A critical piece of the California's eHealth landscape is the eHealth Coordinating Committee, which is convened by Agency to facilitate collaboration and partnership among all entities that are working to implement health information exchange within the state. Representation includes government, ARRA/HITECH grantees, and major California organizations and associations. The eHealth Coordinating Committee is a state policy entity that focuses on health information technology and health information exchange for all of California's citizens.

Where will the funding for this come from? The Department of Healthcare Services (DHCS), using Planning Advanced Planning Document (P-APD) funding, has entered into a contract to cover 50% of the cost to facilitate the work of the eHealth Coordinating Committee and establish the framework for aligning the work of the Partner and the Regional Extension Centers (RECs) with the Medi-Cal EHR Incentive Program. The remainder of the costs are covered by Agency, using funding from the state HIE grant funds. Agency will coordinate multiple and diverse HITECH and eHealth initiatives to support the efforts of California's Medi-Cal providers and hospitals to become meaningful users of EHRs. The goals of the California eHealth Coordinating Committee are:

- To create a common eHealth coordinating entity in California that makes operational policy recommendations to those organizations participating in eHealth activities.

- To identify services that may be leveraged by participants, and propose plans to fund and coordinate their delivery.
- To identify barriers to success for the various partners and propose solutions, providing direct assistance where possible and desired.
- To identify appropriate metrics for tracking EHR/HIE adoption and use statewide.
- To garner support, consensus, and buy-in from California stakeholders.

Entities represented in the California eHealth Coordinating Committee are:

Government:

- California Health & Human Services Agency
- Office of Health Information Integrity (OHII)
- Department of Health Care Services/Medi-Cal (DHCS)
- California Department of Public Health (CDPH)
- California Senate Health Committee
- California State Assembly Committee on Health
- California State Treasurer
- California Business, Transportation and Housing Agency
- California Technology Agency
- CMS, Region IX (Ex Officio)

ARRA/HITECH Grantees:

- HIE Cooperative Agreement Partner Regional Extension Centers (Cal HIPSO, COREC, HITEC-LA)
- California Rural Indian Health Board
- California Telehealth Network
- Western Regional HIT Consortium
- California eHealth Workforce Alliance
- Beacon Grantee UC San Diego

Statewide Organizations/Associations:

- California Academy of Family Physicians
- California Association of Health Plans
- California Association of Physician Groups
- California Association of Public Hospitals & Health Systems
- California Critical Access Hospital Network
- California Hospital Association
- California Medical Association
- California Primary Care Association
- California State Rural Health Association
- California Conference of Local Health Officers
- United Health Group

Agency and all California eHealth partners are committed to engaging and informing as many Californians as possible. The partners' policy of "No Wrong Door" has led to a public eHealth web portal (www.ehealth.ca.gov) whose structure and format allows all partners to post and publish news, funding opportunities, educational, and other calendar events to one location, enhancing visibility and providing a one-stop location for Californian's information needs. This web portal complements and links to the State Level Registry (SLR).

1.1.2 THE AGENCY HIE POLICY AND COORDINATION COMMITTEE

The Agency HIE Policy and Coordination Committee (PCC) was established in October 2009, under the authority of the Secretary of the California Health and Human Services Agency, and reports to the Agency Deputy Secretary for HIE, who also serves as the California HIT Coordinator.

With the primary focus on improving patient outcomes, the purpose of the PCC is to address the policy needs of all Agency Departments and Offices required in order for them to: 1) collaborate on the health information exchange (HIE); 2) incorporate Agency and State eHealth initiatives in response to the ARRA; and to 3) provide a collaborative foundation for future Agency-wide efforts and cross-departmental cooperation in support of HIE and HIT.

The PCC founding goals included:

1. Identify common business processes and requirements, including health information policies and procedures and core data elements, which could be shared among departments to facilitate the efficient provision and sharing of health information. Develop three Agency-wide use cases that provide a framework to describe essential business processes that must be supported by HIE in Agency.

2. Develop a plan for building HIE capacity at the Agency enterprise level in order to securely share commonly required data when programmatically and legally appropriate.

3. Enable departments to better leverage and plan resources to take advantage of opportunities to improve program outcomes as a result of HIE.

4. Provide a committee process that can include other departments, agencies, and communities external to Agency.

5. Provide input to State eHealth planning and implementation processes and the California HIE Operational Plan.

6. Maximize opportunities for obtaining and utilizing shared Agency program and/or departmental funding, including possible Federal matching funds, in support of developing Agency-wide HIE capacity.

Members of the CHHS HIE Policy and Coordination Committee

The members of the CHHS HIE Policy and Coordination Committee include the Directors and Information Officers (or their designees) of all CHHS Agency Departments and Offices, including the California:

1. Department of Alcohol and Drug Programs (ADP)
2. Department of Aging (CDA)
3. Department of Community Services and Development (CSD)
4. Department of Child Support Services (DCSS)
5. Department of Developmental Services (DDS)
6. Department of Health Care Services (DHCS)
7. Department of Mental Health (DMH)
8. Department of Manager Health Care (DMHC)
9. Department of Rehabilitation (DOR)
10. Department of Public Health (CDPH)
11. Department of Social Services (CDSS)
12. Emergency Medical Services Authority (EMSA)
13. Managed Risk Medical Insurance Board (MRMIB)
14. Office of Health Information Integrity (OHII)
15. Office of Patient Advocate
16. Office of Statewide Health Planning and Development (OSHPD)
17. Office of Systems Integration (OSI)

The Deputy Director for HIT, California Technology Agency (CTA), is also an active member of the PCC.

The PCC developed the Roadmap to Health Information Exchange within California Health and Human Services Agency in October, 2010. A key recommendation was that the PCC develop an Agency HIE Plan, including the development of three Agency-wide HIE use cases. These use cases have been drafted. The Agency HIE Plan, 2012-2014, was completed on March 30, 2012 and is before the California Health and Human Services Agency Secretary.

1.1.3 MEDI-CAL EHR INCENTIVE PROGRAM ADVISORY BOARD

Established by DHCS, the Medi-Cal EHR Incentive Program Advisory Board consists of stakeholders specific to the Medi-Cal EHR Incentive Program.

Monthly meetings of the Advisory Board (Table 1) serve to present and vet policy issues as well as solicit feedback for inclusion in the State Medi-Cal Health Plan (SMHP) and development/enhancement of the State Level Registry (SLR). Dialogue relative to these issues extends beyond the meetings, into day-to-day discussions with stakeholders impacted by the issues. The Office of Health Information Technology (OHIT) staff and subject matter experts from various DHCS divisions participate at the Advisory Board meetings and workgroups as determined by program needs.

TABLE 1. THE ADVISORY BOARD STAKEHOLDERS

Stakeholder	Advocacy
California Association of Physician Groups	Physicians
California State Rural Hospital Association	Rural Hospitals and Clinics
California Association of Public Hospitals	Public Hospitals
California HealthCare Foundation	Public Health
California Medical Association	Physicians
California Primary Care Association	FQHCs, RHCs and Patients
California Hospital Association	Hospitals
California Children's Hospital Association	Children's Hospitals
California Rural Indian Health Board	Indian Health Services
COREC	REC
LA Care	REC
CalHIPSO	REC
Community Health Clinic Ole Napa	Local Underserved Population
Redwood Community Health Coalition	Regional Patient Advocacy
Consumers Union	Patient Advocacy
Harbor-UCLA Medical Center	Acute Care Facilities
Inland Empire Health Plan	Regional Health Plan
Kaiser Permanente HealthConnect	Statewide Health Plan
Long Beach Network for Health	Regional HIE
Mercy Medical Group	Regional Healthcare Provider
Santa Clara Valley Health and Hospital System	Regional Healthcare Provider
Western Health Information Network	Regional HIE

The Medi-Cal EHR Incentive Program Advisory Board meets monthly, as does the eHealth Coordinating Committee. Independently, DHCS OHIT, CeC, the eHealth Coordinating Committee and Regional Extension Centers have communication/outreach committees to target their specific stakeholder groups with appropriate messaging and communication modes. The group seeks to launch a statewide campaign to raise awareness of the Medi-Cal EHR Incentive Program among providers and to promote the value of HIT among consumers as a means of expanding our individual education and outreach

efforts. **Empowering providers and consumers through the dissemination of information is a key part of our HIT strategy**. This joint effort is funded through contributions made by each of the respective partners, including DHCS.

1.2 Business Operations

California is building on current regional HIE capacities to achieve statewide interoperability. The state most closely represents the Orchestrator Model as outlined in the ONC State HIE Strategic and Operational Plan Emerging Models Detailed Report. This model is characterized by a thin-layer state-level network, which facilitates HIE transactions across existing sub-state exchanges, forming a network-of-networks. [7] California plans to deploy state-level shared services as appropriate to support regional HIOs, which provide services to end-users. The state and HIE Partner employ policies and funding programs, respectively, to establish or extend regional HIE capacities to cover existing whitespace. For more information please refer to Section 1.8, Environmental Scan.

California operates a hybrid information model implementing HIE architecture to support exchange among public and enterprise HIOs and other health information trading partners. State-level services help to support the trusted exchange of correct information. We'll provide additional detail in Section 1.5, HIE Architecture and Standards.

1.3 Finance

Cost Estimates and Staffing Plans

As discussed previously, Agency is in the process of collaborating with the University of California, Davis, Institute for Population Health Improvement (IPHI) to oversee the Statewide HIE Cooperative Agreement Grant programs. Detailed cost estimates for implementation of programs are under development and negotiations. Execution of a new contract for program administration is anticipated no later than August 31, 2012. Agency will submit an addendum to this section of the Strategic and Operational Plan in the Fall of 2012 that will include a detailed schedule of tasks and sub-tasks that need to be completed over the next 15 months in order to enable statewide HIE along with resources, dependencies, and specific timeframes.

Control & Reporting

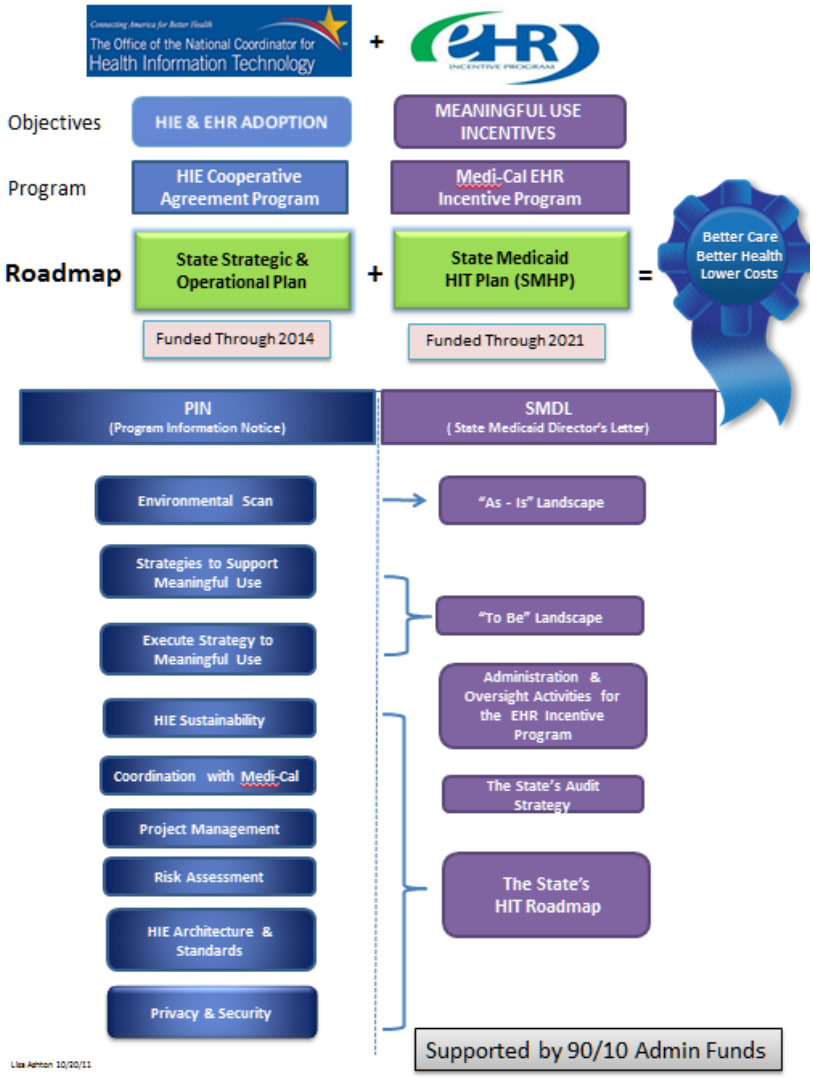
[7] http://www.nationalehealth.org/learn/internal/onc-state-hie-strategic-and-operational-plan-emerging-models

California has allocated a portion of the funding received through the State Health Information Exchange Cooperative Agreement Program to set up an administrative grant management infrastructure. This unit oversees the implementation of financial and procurement policies and procedures of the State as well as sub grantees. This ensures the uniform application of OMB circulars, and ensures 1512 reporting requirements are met. Additionally, this unit conducts periodic assessments of sub grantees to ensure all federal and state requirements are being met and assist with corrections, if needed. Hence, there is a single point of contact to oversee grant management activities and reporting to ONC.

1.4 Collaboration with Medi-Cal

Agency has positioned itself to maximize the opportunities of the ONC-funded Statewide HIE Cooperative Grant Program and the CMS-funded Medi-Cal EHR Incentive Program. This strategy (Figure 2) is spelled out in this HIE Strategic and Operational Plan (SOP). **The SOP, in combination with the State Medicaid HIT Plan (SMHP), tells the story of how California is going to reach the triple aim of better care, better health, and lower costs.** Agency understands that the success and sustainability of its programs, designed to support providers in achieving Meaningful Use through 2014, is foundational to the development and implementation of programs to get Medicaid providers to Meaningful Use through 2021.

FIGURE 2: THE PATH TO THE PRIZE



The CMIO along with OHIT works closely with the Office of the Deputy Secretary for Health Information Exchange (also serving as the HIT Coordinator) in the Agency to coordinate the Medi-Cal EHR Incentive Program with wider health information exchange efforts throughout California and the nation.

The role of the State HIT Coordinator in coordination with Medi-Cal is clearly described in the Office of the National Coordinator (ONC) Priority Information Notice (ONC-HIE-PIN-001). The PIN requires the following five activities:

1. The state's governance structure provides for representation of the Medi-Cal program.

- The Chief of the Office of Health Information Technology (OHIT) serves on the Statewide eHealth Coordinating Committee as well as on the Agency HIE Policy and Coordination Committee for all Agency departments.

2. The HIT Coordinator assists with provider outreach and communications with the Medi-Cal program.

    - OHIT and Affiliated Computer Services, Inc. (ACS), the fiscal intermediary (FI) for the Medi-Cal program, staff are active members of the Education and Outreach Workgroup of the eHealth Coordinating Committee. ACS is responsible for functionality to deliver the CMS Medicaid EHR Incentive Program through the provisions as an optional contractual service under the (FI) contract.
    - OHIT, ACS, and the RECs conduct bi-weekly webinars to address issues with provider and hospital registration at the State Level Registry (SLR).

3. The HIT Coordinator in concert with the Medi-Cal program identifies common business or health care priority outcomes.

    - The HIT Coordinator and OHIT work together with the ONC grantees to meet the ONC Challenge State goals for 2012.
    - The Agency HIE Policy and Coordination Committee identify common goals and objectives across all Agency departments. To date, the committee has identified three distinct cases with common HIT/E solutions.

4. The HIT Coordinator, in collaboration with Medi-Cal, work together through its various committees to leverage, participate in, and support the Beacon Community, Regional Extension Centers, and the ONC-funded workforce projects in California.

    - The HIT Coordinator is developing a strategy with the Medi-Cal program to extend technical assistance for EHR adoption to providers and hospitals outside of the federal grant for the REC's scope of work (e.g. specialists and large integrated health systems).

5. The HIT Coordinator aligns efforts with Medi-Cal to meet Medicaid requirements for Meaningful Use.

    - The HIT Coordinator works closely with the Medi-Cal program to update the State HIE Operational and Strategic Plans with the State Medicaid HIT Plan to ensure a single, coordinated “roadmap” for California to reach its goals for better health, higher quality, and lower costs.

- The HIT Coordinator has been developing and implementing strategies to meet the ONC Challenge Goal to deliver incentive payments to 10,000 Medi-Cal eligible providers for attesting to adoption, implementation or upgrade (AIU) of certified EHR technology by the end of June 2012 and meaningful use attestation by 8,000 providers December 2012

The PIN further defines activities that are highly encouraged for the coordination of the State HIE Cooperative grantee with the Medi-Cal program. These activities include the following:

- Conducting joint needs assessments and environmental scans to include a broad understanding of EHR and HIE adoption by California's hospital and providers segments; including those not eligible for the CMS incentive programs.
- Conducting joint assessment and alignment of privacy policies at the statewide level and in the Medi-Cal program.
- Determining which specific shared services and technical services will be offered or used by Medi-Cal to allow electronic reporting of meaningful use and clinical quality measures to the state and Medicare.
- Determining which operational responsibilities the Medi-Cal program will have, if any, to build capacity for public health reporting.
- Identifying opportunities to use Medicaid HIT incentives to encourage provider participation in HIE.
- Collaborating in activities to encourage the participation of additional provider types that are ineligible for incentives (e.g. pharmacies and labs).

In collaboration with Medi-Cal, public health, labs and local HIEs, CeC convened a Laboratory Services Task Group to develop a strategy for adoption of standards and development of services to support electronic lab data exchange. Specific attention was given to:

- Working with the state to develop a roadmap for enabling lab exchange with Medi-Cal, public health and other state funded providers and entities
- Conducting a survey of messaging and transport standards (and LOINC) currently utilized among providers and labs
- Supporting labs and local HIEs in filling identified gaps
- Ensuring that future grant program priorities include efforts that foster utilization and innovation in lab services

Following its work, the Laboratory Services Task Group reported its recommendations, which included promoting consistent messaging standards

and specifications and determining a strategy to provide lab result routing services (push) among other potential services.

These strategies, together with the functionality created through the development of CeC's core services, intend to enable entities (e.g. state and county labs) to exchange data such as lab results through directed exchange or query/look-up. Medi-Cal will leverage these CeC core services to enable the electronic exchange of laboratory, eRx, and other data among stakeholders across the state enterprise.

The state will leverage the state HIE grant funds, in-kind support from California Department of Public Health, the Implementation Advanced Planning Document (I-APD) and other resources to implement a lab solution that benefits Medi-Cal providers and other stakeholders. Additional core activities include working with the RECs to establish lab reporting requirements between the EHR vendors and the providers adopting their technology; investigation of policy options that may include standard requirements that labs and providers must adhere to for electronically reporting lab results; and exploring contractual provisions with the Medi-Cal managed care entities that address the use of electronic lab reporting tools.

1.5 Technology/HIE Architecture and Standards

The HIE architecture for California follows a neutral connectivity model: a peer-to-peer connection approach enabled and coordinated by a minimal set of shared services. Under this model, no discrimination is made between organizations or systems exchanging information. Any system that meets the consensus technical standards for exchange and the requirements for the trust environment can connect, and can potentially be both a provider and a health information consumer.

The neutral connectivity model has the most flexibility to adapt to California's complex healthcare ecosystem. In this ecosystem, several regional public health information exchanges already exist, many large institutions have significant geographic distribution across California and have created "enterprise exchanges" to meet their needs, and current and future participants in exchange have varied business requirements and needs for information exchange.

The model pushes operations and deployment away from centralized technical services, and instead emphasizes governance and coordination at the state level. For the future, it also enables new shared services to be more innovative, more responsive to market needs, and more rapidly deployed, since any entity is capable of being a shared service provider.

1.5.1 ARCHITECTURAL APPROACH

The technical architecture designed to implement the neutral connectivity model is defined by a set of principles, patterns, and processes as described below:

- The technical architecture should be both flexible and adaptable to meet current requirements and future needs.

- The process for defining the statewide technical architecture must be open and inclusive, and will emphasize: the precise identification of the needs of the community (patients, providers, payers, vendors, government, etc.), the identification of priorities, and a clear statement of the value proposition of HIE.

- Special priority is given to identify and enable those services required by the ONC State HIE Cooperative Agreement Program and prioritized in Program Information Notices, namely electronic prescribing, electronic reporting of lab results, care summary exchange to support transitions of care, and public health reporting of immunizations and lab results for reportable conditions.

- Special consideration is given to identify and enable those services demanded by stakeholders as enhancing quality care delivery and efficiency. These are the services that are most likely to be sustainable.

- The architecture builds upon open national and nationwide standards, including NwHIN specifications and the standards and specifications supported by the Standards & Interoperability (S&I) Framework initiative, thereby leveraging the reference implementations and open-source initiatives supported by ONC.

- The architecture adopts, whenever possible, the technical standards requirements of Meaningful Use criteria and the EHR certification requirements of ONC-Authorized Testing and Certification Bodies, thereby leveraging the significant market pressures of the Meaningful Use initiative to lower interface costs.

- The architecture is based on late binding and service-oriented design principles whenever possible to maximize flexibility and adaptability in an environment of rapid standards development and functionality change.

- The approach is vendor and technology neutral, using open protocols and standards.

The technical architecture is based on a peer-to-peer services topology, with no technical constraints on the connectivity allowed between service providers and consumers (i.e., health information exchanges, service providers, registries,

etc.). This is the most flexible connectivity pattern, enabling any service consumer to connect to any service provider. Shared services are created to enable peer-to-peer connectivity and add efficiencies, where needed. Should future needs dictate, a more constrained connection topologies (for example, a hierarchical connectivity topology that forces all service consumers to connect through a specified set of network services) can be imposed through policy. The state HIE Partner brings together California's state and private technical leaders to identify details of the architecture, select among multiple nationwide standards, and constrain selected standards to produce implementation guides through an open and transparent process that does the following:

- Develops collaboration with strong technical representation from stakeholders, including vendors, so that the technical architecture is consensus-based and practical.

- Develops use cases that span multiple systems as well as multiple organizations to link the architecture to the delivery of value in the healthcare environment. Patient-centric use cases are developed to ensure that implementation maintains a focus on patient involvement and inclusion.

- Selects architecture details and standards based on an understanding of business processes that must be supported. Use cases provide at least one mechanism to identify required business processes. An architecture based on business processes maximizes the functionality and sustainability of technical services.

- Prioritizes implementation activities to correspond to Meaningful Use objectives to maximize ARRA funding opportunities.

- Develops the policy guidance for the minimum necessary architecture to enable practical implementations. Wherever possible, policy and procedures are developed in advance of architecture or standards decisions.

- Ensures access to Medi-Cal data and other state health IT resources by collaborating with Agency to create interfaces to these assets that are interoperable through the statewide technical services.

- Identifies and prioritizes candidate shared services, and informs implementation.

- Works with other states that are engaging in similar efforts and incorporate applicable best practices.

1.5.2 OVERVIEW OF THE STATEWIDE ARCHITECTURE

The architecture for statewide HIE in California comprises:

1) exchange entities, the providers and consumers of health information, in the form of:

    a) public and enterprise health information exchange organizations
    b) direct HISPs and other health information service providers
    c) large healthcare delivery organizations
    d) ancillary service providers
    e) public health registries, Medi-Cal, and other state and federal agencies, and
    f) any other organization with an IT system that exchanges health information; and

2) a small number of lightweight shared services, currently including

    a) directory services
    b) trust services
    c) gateway services

The principal actors within the model are "exchange entities": the providers and consumers of health information. These entities expose technical services that provide and/or consume information using a set of consensus standards and specifications for peer-to-peer information sharing.

Exchange entities may be:

- **Regional public HIOs or enterprise HIOs**, responsible for last-mile connectivity to their users and stakeholders, and providing a high level of exchange to address the local nature of healthcare delivery. The features of these HIOs may differ to meet local market demands and support varying business processes. Large healthcare delivery organizations often share some of the same characteristics of an enterprise HIO, even if based on a single technology and vendor platform, and therefore conceptually fall in the broad category of enterprise HIOs. Most exchange entities will fall under this category.

- **Service providers**, business entities that provide the technical services for health information exchange without the governance processes that are usually the realm of an HIO. Directed exchange services via the NwHIN Direct specifications are often available through so-called health information service providers (HISPs), which fall into this category. California is beginning to see the emergence of service providers that provide most of the traditional exchange services of HIE, beyond directed exchange, as a business offering without governance. These

service providers enable the rapid start-up of HIOs without the need to capitalize and create new technical infrastructures. The architecture supports these service providers as well.

- **Ancillary service providers**, such as pharmacies consuming electronic prescriptions, testing laboratories consuming electronic lab orders and/or providing electronic lab results, imaging clinics consuming electronic radiology orders and/or providing electronic images or radiology notes, etc.

- **Local, state, or federal government agencies and their systems.** This category includes county public health departments, regional or state public health registries, and the Centers for Medicare & Medicaid Services (CMS). Initially, the systems operated by these organizations are consumers of health information – receiving immunization reports, electronic lab results for reportable conditions, other public health surveillance information, clinical quality metrics, etc. Within the architecture, these systems are reached through statewide gateways, a shared service described in more detail below. Ultimately this category will also include bi-directional interfaces to public health (to support, for example, queries for immunization histories) as well as bi-directional exchange with Medi-Cal systems and eventually Veterans Affairs and the Department of Defense medical systems.

Ultimately, exchange entities are any IT system authorized to provide or consume health information with another entity in a peer-to-peer relationship according to consensus exchange standards and conforming to the trust environment established by shared services, governance policies, and operational procedures.

1.5.3 SHARED SERVICES IN THE TECHNICAL ARCHITECTURE

The neutral connectivity model is supported by a small set of shared technical services. Conceptually, these directory and trust services fall into two categories: trust environment and gateways to government services, each of which is addressed separately below.

1.5.3.1 TRUST ENVIRONMENT

California has identified individual and organizational provider identity management as a critical condition for trusted exchange of health information. Through the Direct Project and the S&I Framework, ONC began exploring standards for “provider directories” and mechanisms to utilize and discover digital certificates in a public-key infrastructure (PKI) identity model.

In California, the trust environment for exchange is defined by:

- a set of policies for establishing and recognizing organizational and individual identities,
- operational procedures for how to provision, manage, monitor, and revoke identities, and
- technical services to support discovery of communication services and verify identity.

The technology component of the trust environment comprises “directory and trust services,” and forms a keystone of our overall exchange strategy and architecture.

Directory services establish a mechanism to identify technical services of exchange partners, such as the direct address of a rural primary care provider to which a hospital system might send a discharge summary, or the web services endpoint of an HIO to query for a care summary upon admission. Directory services will build upon the standards work of the Direct Project and S&I Framework.

Trust services establish the identity of exchange entities (Direct HISPs, HIOs, hospital systems, clinics, registries, labs, etc.) and individuals (providers and other care givers, etc.). Technical services to enable trust will be based on policies and operating procedures for identity management, formulated through consensus with stakeholders in California. Like directory services, trust services will build upon the standards work of the Direct Project and S&I Framework.

The HIE landscape in California comprises a number of operating and emerging exchange organizations, including traditional public HIOs as well as enterprise HIE that serve integrated hospital or other delivery organizations. During 2012, we anticipate the emergence of health information service providers operating in the state as well. As a result, each of these organizations manage individual identities per their various policies and operational procedures, and many operation directory services for their users. Rather than replace the working local solutions and take on full identity management for every potential provider and system in the State, we are creating a federated approach to trust services in which individual organizations continue to manage identities of their participants, and the State creates and manages a trusted third-party service – much like a notary public – that attests to the proper adherence to consensus procedural requirements.

We will base our approach on the standards and specifications developed in the Direct Project and S&I Framework initiatives, extending these standards through an open and transparent process to produce a federated solution. It is California’s hope that the result may be used by other states that desire federated management of directory services, trust services, or both.
Initially, directory and trust services will be implemented to support directed exchange using NwHIN Direct specifications. They are coupled tightly with our strategy to support Meaningful Use and the exchange of care summaries.

However, they have a critical role for the more generalized trusted exchange of health information as well. As such, they support not only the exchange of health information among providers, but between any exchange entity conforming to the trust environment requirements.

Importantly, the policies, operational procedures, and technical services that define directory and trust services will be coordinated with other states to create an environment that not only supports inter-entity (e.g., inter-HIO) exchange, but also interstate exchange. The Western States Consortium, of which California is a core member, will inform the policies and procedures for managing and communicating provider identity for ensure it supports interstate exchange.

1.5.3.2 GATEWAYS TO GOVERNMENT SERVICES

Like many states, the current landscape for state government services in California is fragmented. **More unique to California is an environment where many of the state services are not centralized at the state level, but may be housed regionally or seated at the county.** The result is a fragmented set of stove-piped state systems and services with differing information technology capabilities. California plans to consolidate some of these systems in the coming years. For example, 10 separate regional immunization registries exist based on four different technology platforms. California will consolidate these regional registries into a single statewide registry. However, other systems, such as county health departments, will remain separate.

The technical architecture consolidates state and federal government systems logically through “gateways” to information repositories. The result is that the exchange entity for immunization registries appears logically to be a single information consumer for the entire state. The gateway receives, reformats if necessary, queues, and routes information submitted by a provider to the appropriate registry. This architecture provides a smooth transition from a near-term interim solution with 10 separate registries to a long-term state with a single, statewide immunization registry. The gateway hides the implementation of immunization registries in line with service-oriented architectural patterns.

The California Reportable Disease Information Exchange (CalREDIE) fulfills a similar role for public health reporting. CalREDIE acts as a gateway that the California Department of Public Health (CDPH) is implementing for a web services-based capability for receiving electronic lab results for reportable conditions. CalREDIE is designed to be a single Public Health Information Network (PHIN)-compliant electronic disease reporting and surveillance system that presents a single interface to providers that hides the complexity of California’s public health system. CalREDIE provides a single gateway for both care providers’ laboratories, and will be compliant with Meaningful Use requirements. Unlike immunizations, there is no plan to consolidate public health reporting statewide – CalREDIE therefore is not an interim solution.

Web service endpoints will also be established for single-point reporting of clinical quality metrics as required by Meaningful Use to both Medi-Cal and CMS, and to create a single shared instance of an NwHIN Exchange gateway to other federal systems, should the long-term plan for NwHIN governance suggest an appropriate state role for NwHIN.

1.5.3.3 VALUE-ADDED SERVICES

California envisions a role for other, value-added services that may become part of the overall statewide exchange environment. Value-added services are not strategically part of "shared services" in the current technical architecture. Instead, the neutral model establishes value-added services as any other exchange entity that exposes technical services, provides and/or consumes health information, and conforms to the trust environment operational and technical requirements.

1.5.4 TECHNICAL STANDARDS

The architecture for a system is defined as its structure, comprising software (or service) elements, the externally visible properties of those elements, and the relationship among them. While Figure 1 provides an illustration of the elements comprising the statewide architecture for HIE, the properties of and relationships among those elements are defined by interfaces and the technical standards they implement. Therefore, technical standards are a critical component of the statewide HIE architecture.

California applies a set of critical principals to the selection and promotion of any exchange standard:

1) Align with national standards required by Meaningful Use and EHR certification whenever possible.
2) Look forward to adopt proposed stage 2 Meaningful Use certification standards where practical and available from vendors.
3) Adopt ONC implementation guidance from the S&I Framework and other initiatives whenever it fills gaps in meaningful use standards.
4) Align with NwHIN specifications as appropriate between exchange entities.
5) Reduce optionality in implementation guides whenever possible to create a uniform, statewide approach that reduces implementation cost.

The following sections outline how the California architecture applies these principals to the selection and promotion of standards, specifications, and implementation guides.

1.5.5 INTER-HIO AND INTERSTATE EXCHANGE

California stakeholders have identified a business need for both directed exchange and query/response-based exchange between HIOs. California promotes the use of NwHIN Direct specifications for directed exchange, and

NwHIN Exchange specifications for patient discovery (derived from the Cross-Community Patient Discovery (XCPD) profile from IHE) and document discovery and retrieval (derived from the Cross-Community Access (XCA) profile from IHE). This approach allows California to leverage market pressure on vendors created by these ONC initiatives, and allows stakeholders to adopt reference and other open-source implementations and reuse functionality for both intra- and interstate exchange.

California will monitor evolving NwHIN Direct specifications and efforts of Direct certification and accreditation initiatives and adjust our implementation guidance as needed. We will likewise monitor efforts to refactor NwHIN Exchange specifications to adopt lighter-weight REpresentational State Transfer (RESTful) web service models and likewise adjust guidance for our stakeholders.

1.5.6 DIRECTORY AND TRUST SERVICES

Through the Direct Project and the S&I Framework, ONC began exploring standards for directory and trust services using a number of potential technologies, including Lightweight Directory Access Protocol (LDAP), Healthcare Provider Directory (HPD) and its extension by the EHR|HIE Interop Workgroup (HPD+), the domain name service (DNS), and public-key infrastructure (PKI).

California will build on the work of ONC and the S&I Framework for directory services, extending HPD to define a standardized query mechanism (a critical component of interoperability that is not part of the HPD standard) and support federation – both important requirements for the exchange environment in California.

For organizational identity management, California will build upon the work of ONC and the Direct Project to utilize X.509 digital certificates and DNS- and LDAP-based certificate discovery. Plans include cross-certifying with the Federal Bridge Certification Authority to enable exchange with federal agencies requiring it.

Most states have agreed that PKI and the issuance of digital certificates to individuals do not present an affordable option for individual identity management. California will investigate other options, such as those using Security Assertion Markup Language (SAML) assertions of individual identity, including Cross-Enterprise User Assertion (XUA), to select an approach and standard for validating individual identities.

1.5.7 ANCILLARY SERVICES

Whenever possible, California adopts Meaningful Use criteria requirements and EHR certification standards for use by all exchange

entities. California looks forward to the proposed Meaningful Use stage 2 certification criteria as preferred standards to be promoted. In order to support Meaningful Use, promoted standards include the use of:

- National Council for the Prescription Drug Programs (NCPDP) Prescriber/Pharmacist Interface SCRIPT standard, Implementation Guide version 10.6 for e-prescribing, or SCRIPT 8.1 for those vendors that do not yet support Script 10.6;

- HL7 Version 2.x for incorporating clinical laboratory test results into certified EHRs, moving to the HL7 Version 2.5.1 Implementation Guide: S&I Framework Lab Results Interface, Release 1-US Realm as it becomes supported by vendors; and

- HL7 Version 2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health, Release 1 (US Realm), for submission of electronic reportable laboratory results to public health agencies.

Where Meaningful Use or EHR certification identifies optionality, California selects a preferred standard, implementation guide, and/or terminology for all implementation projects that it funds. Preferred standards are identified through an open, consensus process that includes vendors. This reduction in optionality also reduces implementation costs by eliminating custom interfaces and the need to maintain multiple standards.

1.5.8 GATEWAY SERVICES

Whenever possible, California adopts Meaningful Use criteria requirements and EHR certification standards for use in gateways to local and state government systems. California looks forward to the proposed Meaningful Use stage 2 certification criteria as preferred standards to be promoted. In order to support meaningful use, promoted standards include the use of:

- HL7 2.5.1, Implementation Guide for Immunization Messaging Release 1.0 and HL7 Standard Code Set CVX – Vaccines Administered, July 30, 2009 version for immunizations; and

- HL7 Version 2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health, Release 1 (US Realm), for submission of electronic reportable laboratory results to public health agencies.

Where meaningful use or EHR certification identifies optionality, California selects a preferred standard, implementation guide, and/or terminology for interfaces exposed by its gateways. Preferred standards are identified through an open, consensus process that includes vendors. This reduction in optionality also reduces implementation costs by eliminating custom interfaces and the need to maintain multiple standards.

1.5.9 EHR-HIE INTERFACE AND INTEROPERABILITY INITIATIVE

While California fully supports emerging standards for exchange, an opportunity exists to leverage current HL7 standards using interface and interoperability features already built into most EHR software. California launched an EHR-HIE Interface and Interoperability initiative that has created a specification for basic interoperability based on meaningful use requirements and production vendor systems available today. It is the intent that these basic interfaces should be delivered as part of any EHR or other IT system implementation. California is using market pressure to ask EHR vendors, HIE vendors, HIOs, hospital systems, and ancillary systems vendors to adopt the basic interface specification and make it available to all providers. The result will be a more robust, more integrated healthcare landscape, all drawing on current software capabilities and requiring no investment of new development dollars.

California will publish those vendors and organizations that have adopted the basic interface specification, providing full transparency into what vendors provide and at what cost. The resulting “buyer’s guide” will help educate the provider marketplace on what is available and what to purchase. It will also reduce interface costs by reducing variability and custom interface development.

The basic interface specifications require vendors and interoperable organizations to provide an interface as an “orderable kit”, i.e., a standard part number to be ordered, one that is priced and can be quoted and sold. It puts responsibility for interface development squarely upon HIE vendors, service providers, or HIOs to establish secure connectivity, test and map individual interfaces, and provide level-1 interface support. The based interface specification includes:

- Basic admission, discharge, or transfer demographic information on patients as HL7 2.5.1 messages,
- Structured lab results as HL7 2.5.1 messages,
- Chart notes, radiology reports, observations, and other reports as HL7 2.5.1 messages,
- Care summaries as CCD documents,
- Immunization reports as HL7 2.5.1 messages, and
- Orders as HL7 2.5.1 messages.

For structured lab results, immunization reports, and care summary exchange, the requirements are consistent with the requirements for ONC-ATCB certification for CMS’ Stage 1 Meaningful Use incentive program, but further constrains Meaningful Use standards to reduce interface customization and costs.

1.6 Risk Assessment

Managing risk is an important element of successfully building health information exchange (HIE) capacity to support Meaningful Use. Agency has identified known and potential risks. The following table lists these risks, their probability, potential severity, and the strategies to mitigate them.

TABLE 2. RISK ASSESSMENT AND MITIGATION

ITEM	RISK/ ISSUE	PROBABILITY	SEVERITY (IMPACT)	MITIGATION PLANS
1	Breach of protected data, violation of privacy standards, unauthorized disclosure of PHI	low	moderate	Mitigated by the State's efforts to monitor and enforce compliance with relevant security and privacy laws. Resources for reporting of violations will continue to be provided and updated on State websites and webinars. In addition, future HIE standards will specify no reading or storage of PHI during transport.
2	Failure to pass state legislation that harmonizes state and federal differences in the privacy and security of health information.	moderate	high	Mitigated by State plan to identify and address privacy and security issues in need of harmonization with input from statewide privacy and security steering teams. The steering teams recommend privacy and security policies for the electronic exchange of health information. The CalOHII (Office of Health Information Integrity) will provide analysis and policy support for ongoing legislative proposals.
3	Lack of coordination, planning and integration of network infrastructure between health related State agencies	low	moderate	Mitigated by regular inter-agency HIE coordination meetings to assist health related agencies in planning enterprise architecture standards and interfaces.
4	No information exchange taking place in isolated regions of the state	low	moderate	Mitigated by HISP vendors providing Direct messaging to assist providers in isolated geographical regions. HIE grant programs will be continued for HIOs to potentially expand HIE services into underserved areas.
5	Inadequate funding, bandwidth, and technical expertise for rural hospitals and clinics	high	moderate	Mitigated by RECS (Regional Extensions Centers), LECS (Local Extensions Centers), and CTN (CA Telehealth Network) providing technical assistance and resources to enable providers and service providers in sparsely populated areas to explore connectivity and exchange options. RECS will receive additional funding to support clinics and Rural Access Hospitals.
6	Lack of resolution on pharmacy standards impeding progress on interoperability	moderate	high	Mitigated by Agency coordinating efforts to address the eRx messaging and standards issues that if resolved would accelerate and encourage widespread adoption of eRx.
7	Changing standards are not supported by vendors	high	medium	Mitigated by vendor participation in standards discussions, educating stakeholders on upcoming changes, a statewide technology strategy that can migrate with standards updates and application of market pressure to vendors to support a common set of standards across the state.

8	EHR vendor interoperability options and readiness not readily available to providers	high	moderate	Mitigated by establishing value of HIE services, educating stakeholders on the value of HIE, encouraging ONC to communicate the importance of interoperability, applying market pressure to EHR vendors to enable interoperability and coordination through the Regional Extension Centers.
9	HIOs – both public and enterprise – create stovepipes and islands of information	high	moderate	Mitigated by lowering barriers to inter-HIO and interstate exchange, creating model policies and agreements for inter-HIO sharing, creating value in exchange across HIO boundaries, include enterprise HIOs in the discussion, all of which we are starting to do.

1.7 Legal/Policy

For decades, California has been at the forefront in protecting the privacy of our citizens. In 1972, California passed a constitutional amendment to include the right to privacy, which can be enforced against private as well as public entities:

> *All people are by nature free and independent and have inalienable rights. Among these are enjoying and defending life and liberty, acquiring, possessing, and protecting property, and pursuing and obtaining safety, happiness, and privacy.*

Over time, our state laws have been influenced by many fair information practices; we've enacted many laws to ensure individual access, ability to make corrections, openness and transparency, individual choice, collection, use and disclosure limitations, data quality and integrity, safeguards and accountability.

Because of California's many laws and regulations regarding maintaining the confidentiality of medical information, they are sometimes difficult to harmonize with other state laws and HIPAA. Confusion can arise in many situations, such as when the rules apply to one type of entity but not another, the rules may be unique to a type of funding source, or our stakeholders have agreed that the current laws are not adequate for HIE.

Here are a few examples of the kinds of rules and regulations that must be harmonized:

- Health and Safety Code section 123111 requires licensed health care providers to provide individuals access to their medical information.

- Civil Code section 56.07 requires any entity that compiles or maintains medical information for any reason, to provide the patient with a copy of any medical profile, summary, or information maintained by the corporation or entity with respect to the patient, at no charge.

- Health and Safety Code section 1364.5(c) requires health plans to provide notice to patients about how they may obtain access to medical information created by and in the possession of the Health Plan or its contractor.

- The Health Care Providers' Bill of Rights [8]forbids health plan contracts with providers to permit access to patient information in violation of state and federal laws. However, there is no explicit requirements applicable to healthcare service plans to provide patient access.

Rules of the Road

The development of "rules of the road" for HIE is especially difficult in light of the various rules that apply to the entities who are the most likely health information exchange partners. There is a need to simplify the rules. Simplifying the rules doesn't translate into reducing privacy rights, but involves a better understanding of who can share what information with whom and under what circumstances.

The difficulty in facilitating HIE is well known in California. Many lessons were learned from the demise of the Santa Barbara Project in 2006. *The Retrospective: Lessons Learned from the Santa Barbara Project and Their Implications for HIE* (http://content.healthaffairs.org/content/26/5/w589.full), shares these insights. One of the main lessons, write the authors, is addressing privacy and liability issues early:

> *Privacy and liability issues need to be addressed up front. RHIOs should start with local policies as a base (for example, those established by the local hospital), understand federal and state regulations, and engage relevant stakeholders, including consumers, from the onset. Involving consumers in the process of developing these policies will have another valuable consequence: both input and buy-in from a powerful customer base.*

1.7.1 FAIR INFORMATION PRACTICES

The California Privacy and Security Advisory Board (CalPSAB) was appointed in 2006 to represent consumers and a wide variety of healthcare stakeholders. The Board was charged with overseeing and coordinating a statewide collaborative process to identify privacy and security standards and policies necessary for the safe exchange of electronic health information in California.

One of the first tasks accomplished by CalPSAB was developing the California Health Information Exchange Practices Principles. The

[8] Health and Safety Code section 1375.7.

Principles, developed over a two-year period, were based upon a variety of successful principles for privacy and security of individual information. The principles included:

- Connecting for Health – Markle (9 Principles)
- Consumer Union Guiding Principles
- Health Privacy Working Group (11 Principles)
- E-Health Initiative connecting Communities Common Principles
- OECD Fair Information Practice (8 Principles)
- Japan Personal Information Protection Act (5 Principles)
- APEC (9 Principles)
- EU (9 Principles)

To ensure transparency and public participation, the Principles were posted on the CalOHII website in early 2009 for 30 days from February 26, 2008 until March 28, 2008 for public comments. The principles were also emailed to over 400 interested parties on the CalPSAB contact list. Comments were received on the Principles from: Analex, Incorporated, OSHPD, CalRHIO, California Health Information Association, WellPoint, CDVA, and Catholic Health Care West, and approximately 1250 individuals.

The Board received comments, provided responses to those comments, and made one change to the Principles, which were then submitted to the Secretary of the Health and Human Services Agency. The Secretary approved the Principles, and they were posted on CalOHII's website as recommended guidelines for privacy and security principles for electronic health information exchange in California. Subsequently, these Principles were incorporated into the demonstration regulations.

Before these principles were adopted by California Secretary of Health and Human Services, the Office of the National Coordinator (ONC) released a Privacy and Security Framework, consisting of the national principles. According to ONC, these principles:

- Were designed to complement and work with existing federal, state, territorial, local, and tribal laws and regulations.
- Should not be construed or interpreted as supplanting or altering any applicable laws or regulations.
- Should evolve in concert with technological advances that allow for greater protections.

Comparing California Principles and Federal Principles

In comparing the California Principles with the HHS Framework, generally California Principles are *more specific* than the Federal Principles, while incorporating its broader concepts.

California Principles has one missing component, which is specific to patient rights to HIE consent. At the time the California Principles were developed, CalPSAB chose not to address patient HIE consent until its work was completed on this issue. That work was completed in December 2010, after unanimous approval of a policy recommendation for opt-in consent. The California principles have not been updated to reflect that recommendation; however, the demonstration regulations do reflect the opt-in preference with opportunities to test alternatives.

The HHS framework is more specific than California's principle in addressing the Security Safeguards. However, the demonstration regulations for security incorporate all the concepts addressed in the federal framework for security safeguards.

1.7.2 STAKEHOLDER ENGAGEMENT IN OPEN AND TRANSPARENT PROCESSES

Many teams have evolved to work toward harmonizing privacy laws. Building on the close collaboration between CalOHII and the wide spectrum of stakeholders, Agency established the Privacy Steering Team, the Security Steering Team, and the task groups formed by these steering teams. These steering teams and task groups have embarked on discussions for harmonizing California and federal privacy and security law, specifically how to address the ambiguity and lack of harmonization in state and federal laws regarding applicable rules for collection, use, and disclosure of health information. CeC is also working with stakeholders in developing policies and procedures for trusted environments.

As part of its ongoing transparency process, advance notice of these meetings is posted on public web sites, which also provides telephone and webinar access to the public. Final work products are also publically posted and public comments are solicited.

As discussed more fully in Section 5, the privacy and security framework details the various legal frameworks available: statutory, regulatory, contractual and best practices that are being coordinated by Agency. There are five separate efforts:

1. **Work toward** Law Harmonization to simplify the integration of HIPAA and state laws.

2. **Create** Demonstration Projects to test policies and rules to better inform the State and health care stakeholders while the HIE infrastructure is being defined over the next several years.

3. **Develop** contractual language, policies, and procedures, consistent with state and federal laws and best practices, to ensure a trusted environment for HIE.

4. **Provide** a Risk Assessment Tool to enable small providers to conduct their own risk assessments.

5. **Facilitate** patient and provider engagement and education.

1.8 Environmental Scan

1.8.1 EHR ADOPTION IN CALIFORNIA

California's health care practitioners have been found to be approximately on par with the balance of the national practitioners with regarding EHR adoption, according to preliminary landscape assessments. Data from 2005 indicated that only 14% of practitioners had implemented EHRs. Subsequent studies have indicated that for some functions, such as electronic receipt of laboratory results or electronic receipt of emergency room notes, California providers may have attained 80% compliance.

Providers in large, integrated health systems, such as Kaiser Permanente, have achieved much higher rates of EHR adoption than those in smaller or solo practices. However, the data on EHR adoption by individual providers is limited, somewhat out-of-date, and requires additional assessment. No recent data is available specific to the use of EHRs by Medi-Cal providers. For this reason, the Department of Health Care Services is funding an annual survey of physicians through the Medical Board of California in conjunction with researchers at the University of California to monitor the adoption of EHRs throughout California, including the Medi-Cal providers.

The information on California's hospitals is somewhat more recent and optimistic than that for individual practitioners. Data from 2006/2007 indicated that 55% of California's hospitals have fully or partially implemented EHRs. Surveys in 2010 indicate that 87% of children's hospitals and 33% of critical access hospitals have implemented EHRs. However, the functionality of hospital EHRs is highly variable, often proprietary, and it is difficult to draw any accurate conclusions regarding meeting Meaningful Use, although it will undoubtedly be a lesser effort than that of practitioners. Preliminary assessment data from surveys of large medical groups and independent practice associations (IPAs) indicate higher rates of adoption of EHRs than for small group practices. This is undoubtedly due to the infrastructure support that these larger groups tend to provide their members. The data from hospitals and other health system entities is highly varied and not comparable.

1.8.1.1 EHR ADOPTION BY PHYSICIANS

Researchers at UCSF conducted a survey of physicians with MD degrees in 2011. A questionnaire was sent to 10,353 physicians whose license renewals

were due to the California Medical Board between June 1 and July 31, 2011. The questionnaire included questions that assessed whether a physician had an EHR at his/her main practice location, as well as questions that measured 8 of the 15 core objectives and 4 of the 10 menu objectives that CMS has set forth for meaningful use of EHRs. The analysis was limited to the 7,931 of the 10,353 physicians in the sample who reported that they practiced in California and provided at least one hour of patient care per week; 5,384 of these 7,931 (68%) completed the supplemental survey.

Major Findings

Prevalence of Electronic Health Records

- 71% of respondents reported having any sort of EHR at their main practice location.
- Only 30% of respondents reported having an EHR at their main practice location that can achieve all 12 of the Meaningful Use objectives measured.
- Rates at which functions required to meet CMS's Meaningful Use objectives were available varied, ranging from a low of 40% of total respondents for providing patients with access to their own electronic records (64% of respondents with EHRs) to a high of 60% for clinical notes and lists of patients' medication allergies (95% of respondents with EHRs).
- Respondents were more likely to report using functions that gave them information they could use in their encounters with individual patients than functions associated with assessing quality of care or exchanging information electronically with patients or other providers.

Satisfaction with Electronic Health Records

- 35% of respondents with EHRs are very satisfied with them, 38% are somewhat satisfied, 13% are somewhat dissatisfied, and 14% are very dissatisfied.
- Respondents who indicated that their EHRs could meet the 12 Meaningful Use objectives measured were more likely to be satisfied with their EHRs.

Factors Associated with Use of Electronic Health Records at Main Practice Location

- Practice type is the strongest predictor of EHR availability. Physicians who practice in large organizations, including Kaiser Permanente, are much more likely to have an EHR at their main practice location than physicians in solo practice, small partnerships, or community/public clinics.
- Kaiser Permanente physicians are also more likely to have an EHR that can meet the 12 Meaningful Use objectives measured.
- Physicians under age 46 years are more likely to have EHRs at their main practice location than physicians age 46 years or older, largely

because they are more likely to practice in large organizations. Hospital-based physicians are more likely to have EHRs than office-based physicians.
- Urban physicians are more likely to have EHRs than rural physicians.
- Specialty is not a strong predictor of having an EHR. Primary care physicians are only slightly more likely to have EHRs than specialist physicians.

Physicians' Plans Regarding EHR Incentive Payments

- 37% of physicians plan to apply for either Medi-Cal or Medicare incentive payments for meaningful use of EHRs.
- Some physicians do not appear to be well-informed about the eligibility criteria for Medi-Cal incentive payments.
- Over half of physicians who appear eligible for Medi-Cal incentive payments do not believe they are eligible, do not plan to apply, or need further information about the program.

Findings for Respondents Who Appear Eligible for Medi-Cal EHR Incentive Payments

- An estimated 21,545 of physicians with active California licenses (17%) appear eligible for Medi-Cal EHR incentive payments based on information they provided regarding their payer mix, practice setting, and practice type.
- Respondents who appear eligible for Medi-Cal EHR incentive payments are much more likely to practice in community/public clinics than all respondents (33% vs. 6%) and are less likely to practice in Kaiser Permanente's medical group (9% vs. 15%) or to be in solo practices (9% vs. 17%).
- Primary care physicians are more likely to be eligible for Medi-Cal EHR incentive payments than specialists, most likely because hospital-based physicians, who are predominantly specialists, are not eligible for these payments.
- Physicians who appear to be eligible for Medi-Cal incentive payments are somewhat less likely to report having any sort of EHR (68% vs. 72%) or an EHR that can meet the 12 Meaningful Use objectives measured (30% vs. 33%) than physicians who appear to be ineligible.
- Similar to total responders, eligible physicians who practiced at Kaiser Permanente or in other large organizations were much more likely to have an EHR than physicians in solo practice, small partnerships, or community/public clinics.

The findings from this survey suggest that EHRs are widely available in California physicians' practices, but that many of these EHRs do not have the functions needed to meet CMS's objectives for Meaningful Use of EHRs. Although 71% of physicians responding to the survey have some sort of EHR, only 30% have EHRs that, as currently configured, can meet all 12 of the MU

objectives measured in the study. Rates of EHR availability are lowest among physicians who are in solo practice, small partnerships, and community/public clinics. Office-based physicians are less likely to have EHRs than hospital-based physicians and rural physicians are less likely to have them than urban physicians.

The survey results also suggest that the Medi-Cal EHR incentive payments are well-targeted to increase meaningful use of EHRs. The majority of respondents who appear eligible for Medi-Cal incentive payments (70%) do not currently have EHRs that can meet all 12 of the Meaningful Use objectives measured in the survey. Thirty percent do not have any sort of EHR.

1.8.1.2 EHR ADOPTION BY NON-PHYSICIANS

Current data on non-physician practitioner use of EHRs (including Medi-Cal providers) is limited. In 2010, the California HealthCare Foundation published a survey of dental practices in California that only attained a 3.7% response rate. This survey found that 23% of respondents reported having a fully functional dental EHR. Among Denti-Cal dentists, 37% reported being likely to participate in ARRA incentive programs, with an additional 27% somewhat likely.

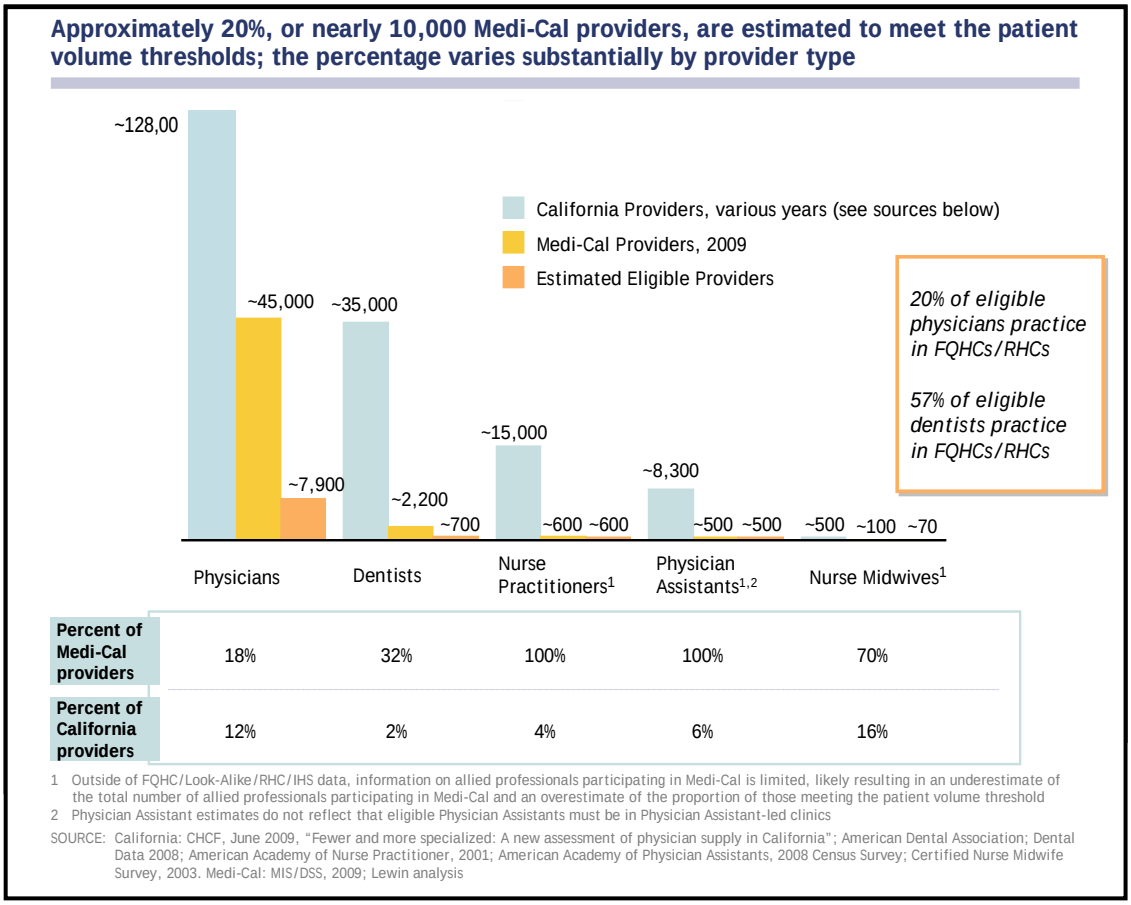
Much more information is needed to help fill the gap of knowledge about EHR use by non-physician providers. To this end, DHCS has contracted with researchers at UCSF to modify the survey they have developed for the Medical Board of California for use with nurse practitioners and certified nurse midwives. This was administered in September-December 2011 through direct mailing to a random sample of 5000 providers. Results will be available in Summer 2012.

1.8.1.3 EHR ADOPTION BY HOSPITALS

A 2010 study by Lewin Group and McKinsey & Company found that 242 of 435 (55%) of the hospitals in California will be potentially eligible for Medi-Cal incentive payments, based on Medi-Cal discharge volumes and other eligibility factors.

(Figure 3). Eight of these are children's hospitals; the remaining 234 are general acute care facilities. Statewide, these eligible hospitals will account for more than 93% of all Medi-Cal discharges and 72% of all acute care hospital bed days.

FIGURE 3. PERCENTAGE OF PROVIDERS QUALIFYING FOR INCENTIVE PAYMENTS



EHR Adoption and Use

In 2011 UCSF researchers conducted an analysis of the Information Technology Supplement of the 2010 AHA Annual Survey for Agency. In California, the sampling frame was 419 hospitals, 205 of which responded (48.9% response rate). The researchers also utilized 2009-2010 financial data for California hospitals submitted to the Office of Statewide Health Planning (OSHPD). For this study, the variables used from this source were descriptive variables about the hospitals, not variables about their EHR adoption, meaningful use, or health information exchange capabilities. The hospitals in the AHA and OSHPD data sources were matched using their respective CCNs. The final sampling frame included 342 California acute care non-federal hospitals.

The 12 Meaningful Use core measures listed in Table 3 were used to assess the extent of MU objectives attained in each hospital. In order to achieve "meaningful use," a hospital needs to have the capabilities of all 12 core measures. For this report, a Meaningful Use Core Measures Index (0-12 possible points) was created by summing each hospital's score for each meaningful use core measure (0 or 1 point). For the remainder of this report, the meaningful use core measures index score will be referred to as the "MU score."

TABLE 3. MEANINGFUL USE CORE AND MENU OBJECTIVES

Core Measures	Menu Measures
• Record key demographics	• Laboratory reports
• Report HQA and PQRI quality measures	• Perform medication reconciliation
• Maintain up-to-date problem list	• Record advanced directives
• Maintain active medication list	• Summary care record for relevant transitions in care
• Record vital signs	• List of patients by specific conditions*
• Record smoking status	• Drug formulary checks*
• Maintain comprehensive list of allergies	• Patient-specific education resources*
• Use CPOE for medications	• Capability to electronically submit immunization data*
• Implement at least 1 of 6 clinical decision rules	• Capability to electronically submit laboratory results to public health agencies*
• Implement drug-drug and drug-allergy interaction checks	• Capability to electronically submit syndromic surveillance data to public health agencies*
• Give patients electronic copy of health info	
• Discharge summaries	
• Capability to electronically exchange key clinical information among providers of care and patient authorized entities*	
• Protect electronic health information in EHR through appropriate technical capabilities*	

NOTE: *Not included in the 2009 AHA Annual Survey IT Supplement.
SOURCE: Eligible Hospital and CAH Meaningful Use Table of Contents; Core and Menu Set Objectives.[3]

To assess the extent of HIE capabilities adopted in each hospital, a HIE question from the AHA Annual Survey Information Technology Supplement was used. The question reads: "Does your hospital electronically exchange any of the following patient data with any of the providers listed below? (Check all that apply.)" The four types of providers listed were: 'with hospitals inside of your

system,' 'with hospitals outside of your system,' 'with ambulatory providers inside of your system,' and 'with ambulatory providers outside of your system.' The five types of patient data to be shared with any of the four provider types were: patient demographics, clinical care record, laboratory results, medication history, and radiology reports.

Table 4 displays descriptive data on the 182 acute care non-federal California hospitals that responded to the AHA Annual Survey IT Supplement. The majority of hospitals are non-profit and treat both adults and children.

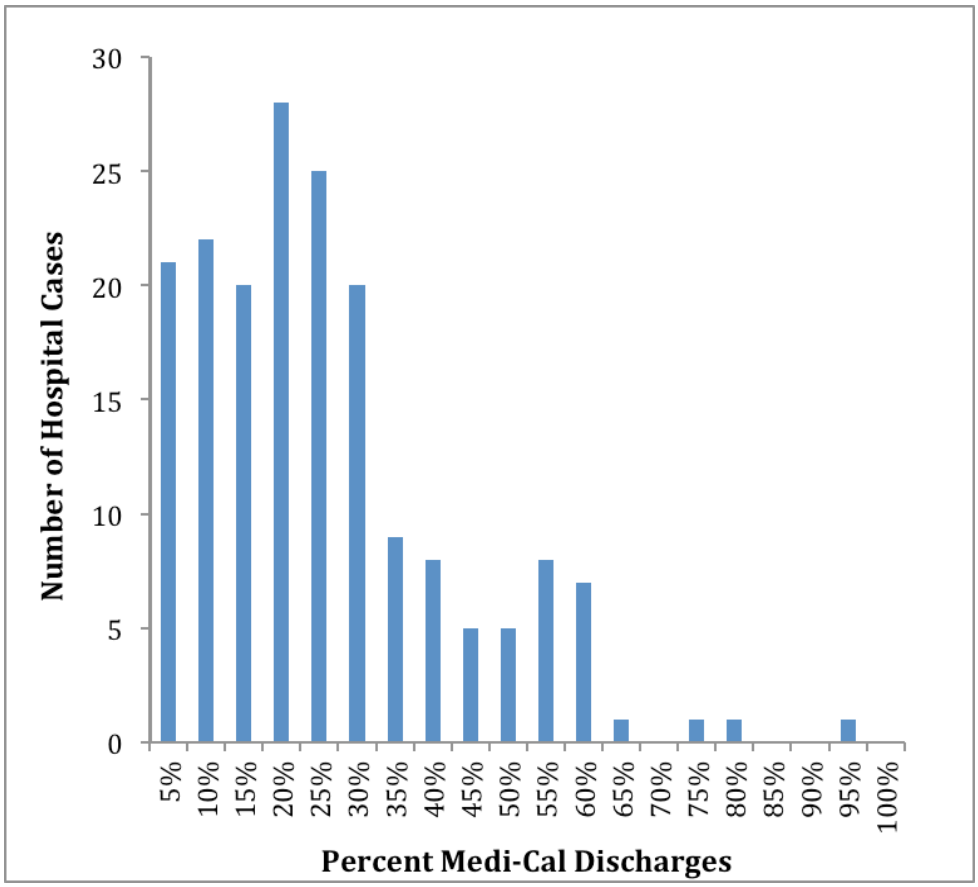
TABLE 4. DISTRIBUTION OF ACUTE CARE, NON-FEDERAL HOSPITALS; N=182 HOSPITALS

	% of Hospitals	*Number of Hospitals*
Ownership:		
Non-Profit	63.2%	115
Investor	15.9%	29
District	15.9%	29
City/Country	4.9%	9
Type of Hospital:		
Small/Rural	19.8%	36
Teaching	8.2%	15
Neither	72.0%	131
Type of Care:		
General	96.2%	175
Children's	2.7%	5
Size (licensed beds):		
0-99 beds	18.1%	33
100-199 beds	25.3%	46
200-399 beds	33.0%	60
400+ beds	23.6%	43
Size (acute care beds):		
0-99 beds	26.9%	49
100-199 beds	24.7%	45
200-399 beds	35.7%	65
400+ beds	12.6%	23
Kaiser:		
Yes	5.5%	10
No	94.5%	172

SOURCE: 2011 UCSF California Hospital EHR Linked Data File.

Figure 4 displays the distribution of ratios of Medi-Cal discharges to total discharges among California hospitals. The mean percentage of Medi-Cal discharges was 24%. For 17.6% of hospitals, Medi-Cal discharges comprised less than 10% of total discharges.

Figure 4. Ratio of Total Discharges That Are Medi-Cal Discharges; N=182 Hospitals



NOTE: Mean=24.0%, SD=17.0%.
SOURCE: 2011 UCSF California Hospital EHR Linked Data File.

Meaningful Use

Table 5 shows the percent and number of California hospitals that met each specific meaningful use core or menu measure objective. Over 85% of hospitals were able to record key demographics and view laboratory reports (items in green). Less than half of hospitals met the four core meaningful use objectives (items in red): these included maintaining up-to- date problem lists and using computerize provider order entry for medications.

TABLE 5. PERCENT OF HOSPITALS THAT HAVE IMPLEMENTED MEANINGFUL USE MEASURES; N=182 HOSPITALS

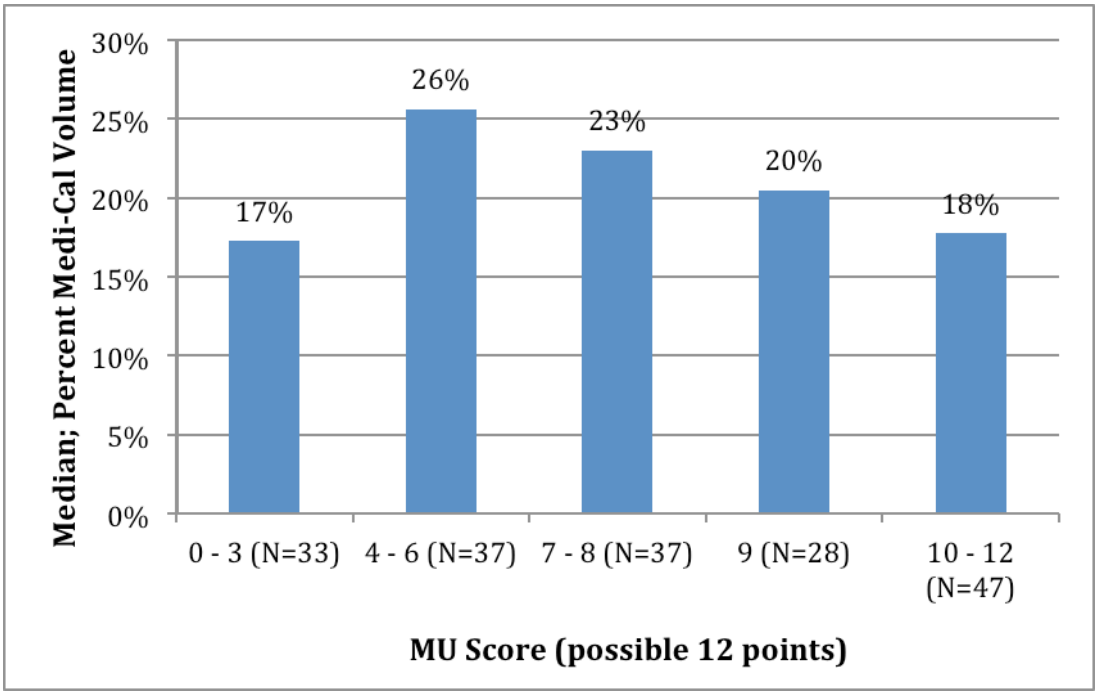
	Meaningful Use Measures	% of Hospitals	N
Core Measures	Record key demographics	88.5%	161
	Maintain comprehensive list of allergies	74.2%	135
	Record smoking status	74.2%	135
	Discharge Summaries	73.1%	133
	Maintain active medication list	69.8%	127
	Implement at least 1 of 6 clinical decision rules	69.2%	126
	Record vital signs	64.8%	118
	Implement drug-drug and drug-allergy checks	63.2%	115
	Maintain up-to-date problem list	45.6%	83
	Use CPOE for medications	36.3%	66
	Give patients electronic copy of health information	35.7%	65
	Report HQA and PQRI quality measures	21.4%	39
Menu Measures	Laboratory Reports	89.6%	163
	Perform medication reconciliation	57.1%	104
	Summary care record for relevant transitions in care	55.5%	101
	Record advanced directives	53.8%	98

SOURCE: 2011 UCSF California Hospital EHR Linked Data File.

OUT OF A POSSIBLE 12 POINTS, THE MEAN SCORE WAS 7.2 AND THE MEDIAN SCORE WAS 8 FOR CALIFORNIA HOSPITALS.

Figure 6 displays the relationship between the MU score and the extent to which the hospitals serve Medi-Cal patients. Except for hospitals with the lowest MU scores, there was a negative relationship between MU score and Medi-Cal discharges as a % of total discharges.

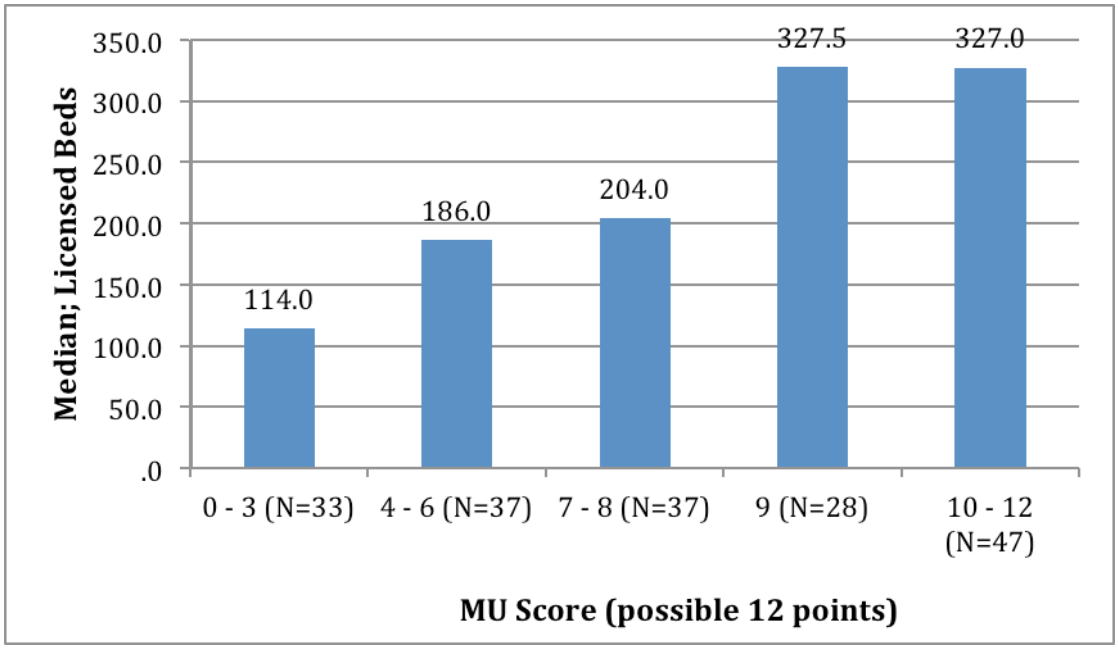
Figure 6. Association Between MU Score and Median Ratio of Medi-Cal/Total Discharges; N=182 Hospitals



NOTE: ANOVA test of significance of the difference between means: p=0.052.
SOURCE: 2011 UCSF California Hospital EHR Linked Data File.

Figure 7 below displays the relationship between MU score and hospital ownership. Most hospitals fell into the categories of non-profit, and the mean MU score for this category was 7.9 out of a possible 12. The mean MU Score for hospitals owned by a city or county was similar (7.7), while the mean MU Score for investor-owned hospitals and district hospitals were lower (6.0 and 5.4, respectively). The analysis revealed a strong direct relationship between higher MU score and larger hospital size.

Figure 7. Mean MU Score by Hospital Size; N=182 Hospitals.



NOTE: ANOVA test of significance of the difference between means: p=0.002.
SOURCE: 2011 UCSF California Hospital EHR Linked Data File.

Forty-seven California hospitals scored between 10 and 12 points on the meaningful use core measures index. These 47 high-scoring hospitals were responsible for 35% of all California discharges, and 30% of Medi-Cal discharges. Among respondents, these hospitals included:

- All 10 Kaiser hospitals;
- 4 of the 5 children's hospitals;
- 8 of the 15 teaching hospitals;
- 3 of the 36 small/rural hospitals;
- The median number of licensed beds was 327, and the median ratio of Medi-Cal discharges to total discharges was 17.8%.

Seventy California hospitals scored between 0-6 points on the meaningful use core measures index. These 70 low-scoring hospitals were responsible for 29% of all California discharges, and 32% of Medi-Cal discharges. Among respondents, these hospitals included:

- 2 of the 15 teaching hospitals;
- 23 of the 36 small/rural hospital;
- The median number of licensed beds was 157 (less than half of the high scoring hospitals), while the median ratio of Medi-Cal discharges to total discharges was 22.9% (somewhat higher than the high scoring hospitals).

"Unlikely to Implement": Spotlight on Computerized Physician Order Entry for Medications

Table 6 shows the percent of hospitals that had achieved each meaningful use core or menu measure, compared to the percent of hospitals that responded that they were unlikely to implement (see description of this response category below) that measure. More than one-quarter of California hospitals indicated that they were unlikely to use Computerized Physician Order Entry (CPOE) for medications: as CPOE is challenging to implement and use, this represents a major obstacle to achieving widespread meaningful use for California hospitals.

TABLE 6. MEANINGFUL USE MEASURES; N=182 HOSPITALS.

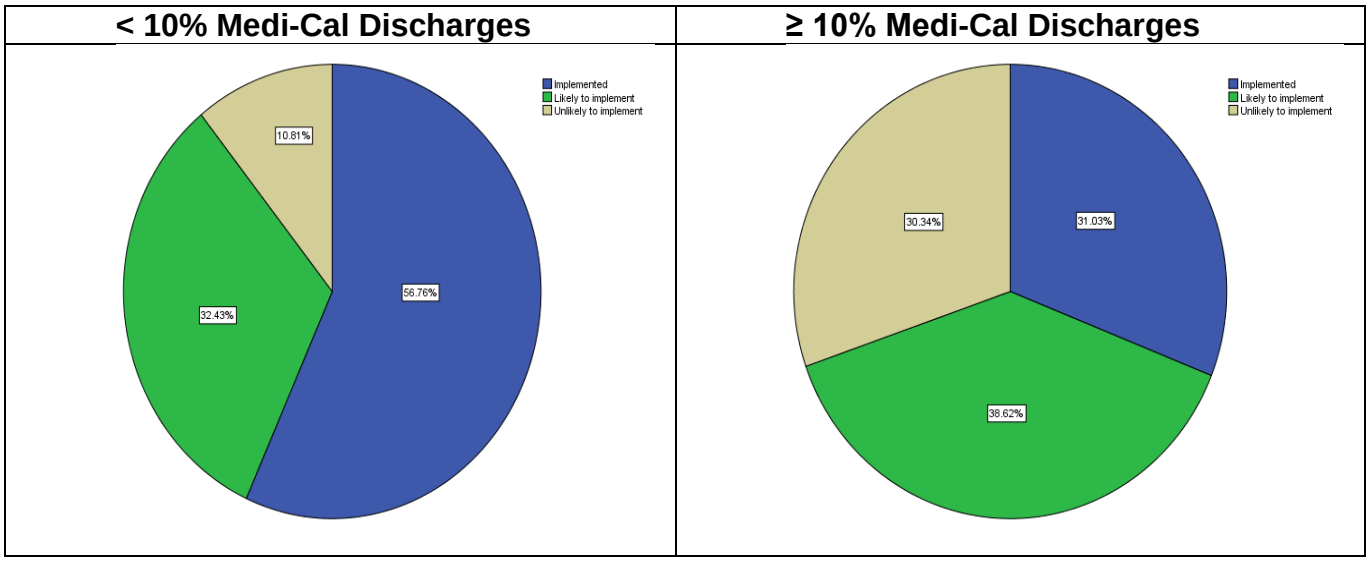
	Meaningful Use Measures	% Hospitals Implemented	% Hospitals Unlikely to Implement
Core Measures	*Report HQA and PQRI quality measures*	*21.4*	*n/a*
	Give patients electronic copy of health info	*35.7*	*n/a*
	Use CPOE-Medications	**36.3**	**26.4**
	Maintain up-to-date problem list	45.6	19.8
	Implement drug-drug and drug-allergy checks	63.2	14.8
	Record vital signs	64.8	13.7
	Record smoking status	74.2	11.5
	Discharge summaries	73.1	10.4
	Maintain active medication list	69.8	10.4
	Maintain comprehensive list of allergies	74.2	9.9
	Implement at least 1 of 6 clinical decision rules	69.2	9.9
	Record key demographics	88.5	4.4
Menu Measures	*Perform medication reconciliation*	*57.1*	*n/a*
	Record advanced directives	53.8	23.1
	Summary care record for relevant transitions in care	55.5	20.3
	Laboratory reports	89.6	6.0

NOTE: The measures italicized and with "n/a" under "% Hospitals Unlikely to Implement" did not have answer choices in the AHA Annual Survey Information Technology Supplement that could be interpreted as "unlikely to implement."
SOURCE: 2011 UCSF California Hospital EHR Linked Data File.

Figure 9 displays the extent of implementation of computerized physician order entry (CPOE) for medications, among hospitals with less than 10 percent Medi-Cal discharges (not eligible for Medicaid EHR incentives) or greater than or equal to 10 percent Medi-Cal discharges (eligible for Medicaid EHR incentives). Hospitals not eligible for EHR incentives (left hand side pie chart) were far more likely to have implemented CPOE (blue color), and were less unlikely to

implement CPOE (tan color), compared to hospitals not eligible for EHR incentives (right hand side pie chart).

FIGURE 9. EXTENT OF IMPLEMENTATION OF CPOE FOR MEDICATION ACCORDING TO PERCENT MEDI-CAL DISCHARGES; N=182 HOSPITALS.



NOTE: Chi-square test of significance of the difference between counts: p=0.007.
SOURCE: 2011 UCSF California Hospital EHR Linked Data File.

Key findings for the N=182 hospitals include:

- 37% of hospitals are in an area with a regional HIE entity (for example, the Orange County or LA regional HIE entities);
- 18% of hospitals participate in regional HIE entity;
- 39% of hospitals do NOT participate in a regional HIE entity but have electronic framework to do so; and
- 42% of hospitals do NOT participate in a regional HIE entity and do NOT have electronic framework to do so.

Table 7 displays the percent of hospitals that are exchanging data with affiliated and unaffiliated hospitals and providers. Overall, the most progress was made in exchanging data with ambulatory care providers and hospitals within a health care system, with less progress made in exchanging data with ambulatory care providers outside the system, and very little progress in exchanging data with unaffiliated hospitals.

TABLE 7. IMPLEMENTATION OF HEALTH INFORMATION EXCHANGE MEASURES; N=182 HOSPITALS

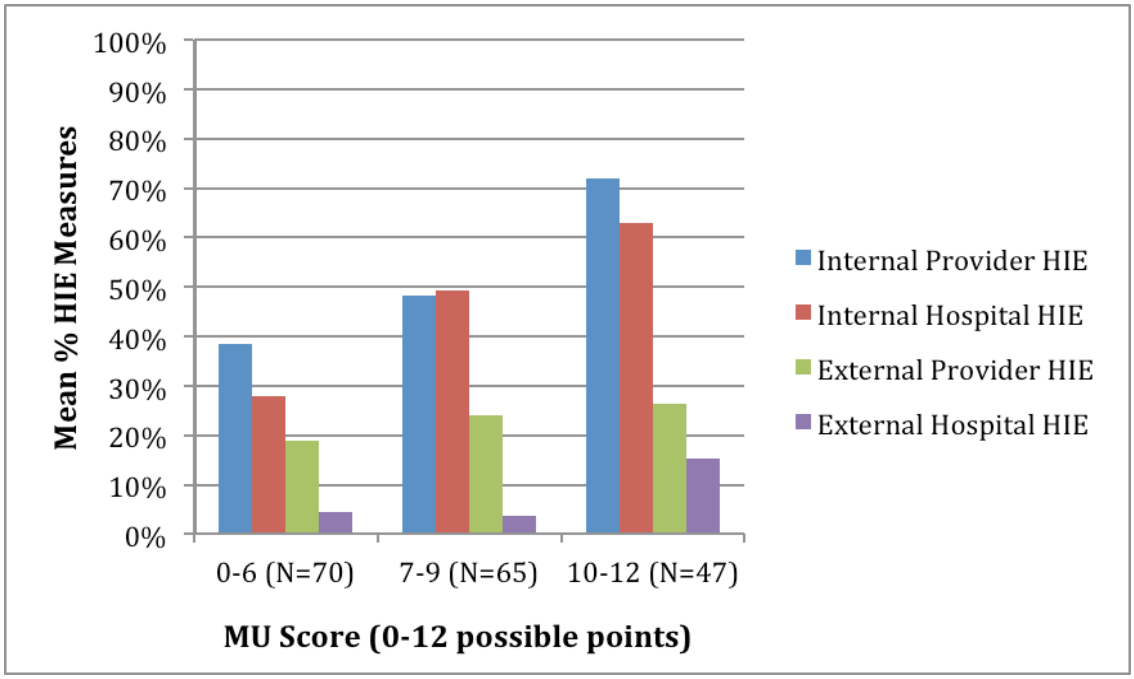
	Affiliated Entities/Providers		Unaffiliated Entities/Providers	
HIE Measures (Types of Data)	With ambulatory care providers inside system	With hospitals inside system	With ambulatory care providers outside system	With hospitals outside system
Patient demographics	56.8%	48.6%	25.1%	7.7%
Laboratory results	56.8%	47.0%	33.3%	9.8%
Radiology reports	57.4%	45.9%	30.1%	9.3%
Clinical care record (clinical hist, exam)	40.4%	40.4%	12.0%	4.4%
Medication history	40.4%	39.9%	12.0%	3.8%
At least 1 type of data	62.3%	52.5%	38.3%	12.6%
All 5 types of data	21.3%	37.7%	9.8%	2.7%

SOURCE: 2011 UCSF California Hospital EHR Linked Data File.

Relationship between Meaningful Use and Health Information Exchange

Figure 10 displays the association between progress toward meaningful use (MU Score) and health information exchange for California hospitals. All types of HIE were more prevalent among hospitals with higher MU Scores, compared to hospitals with lower MU Scores.

FIGURE 10. HEALTH INFORMATION EXCHANGES MEASURES IMPLEMENTATION ACCORDING TO MU SCORE; N=182 HOSPITALS



NOTES: ANOVA test of significance of the difference between means: Internal Provider HIE (p<0.001); Internal Hospital HIE (p<0.001); External Provider HIE (p=0.461); and External Hospital HIE (p=0.009).
SOURCE: 2011 UCSF California Hospital EHR Linked Data File.

Summary of Findings and Policy Implications

- Overall, achieving EHR meaningful use objectives varies a great deal among hospitals
- Greater prevalence of Medi-Cal patients is associated with lower EHR meaningful use scores
- Hospitals that are smaller, rural, or investor owned tended to have lower MU scores
- Implementing CPOE presents the most difficult challenge in achieving EHR meaningful use: about ¼ of hospitals appear to be unlikely to achieve meaningful use in the foreseeable future
- Data exchange is modest with affiliated providers and hospitals within a system, is less with unaffiliated providers, and is least with unaffiliated hospitals. The extent of data exchange is correlated with the level of MU scores.
- The AHA dataset was a relatively good source of data for the purpose of determining progress towards achieving EHR meaningful use. Given the variation in response rate by type of hospital, OHIT may want to consider supplementing data collection efforts in future years.

1.8.1.4 EHR ADOPTION BY VETERAN ADMINISTRATION HOSPITALS

Veterans Administration hospitals were excluded from the analysis of the 2010 AHA Survey. However, it is well known that they are leading the charge when it comes to EHR implementation: All VA hospitals in California use the highly successful Vista EHR system. The Veterans Administration San Diego Medical Center (VASDMC) recently launched an electronic medical data exchange and instant access program with Kaiser Permanente. This is exciting because it represents the first time a federal agency and a private healthcare organization have linked their computerized patient-records systems. In addition, the Naval Medical Center and VASDMC have established Virtual Lifetime Electronic Records (VLER) to share data. The VASDMC is a member of the Beacon Community collaborative led by the University of California, San Diego.

CALIFORNIA CRITICAL ACCESS HOSPITALS (CAHs)

California's Critical Access Hospitals (CAHs) serve rural Medicare patients on cost-based reimbursement for Medicare services and traditional fee-for-service for private payers and Medi-Cal. What constitutes a CAH? A CAH must provide 24-hour services, must be a minimum of 35 miles away from another hospital (15 miles in the case of mountainous terrain or in areas with only secondary roads available), must not exceed an average length-of-stay of 96 hours in the hospital business unit, and have a maximum of 25 beds, including "swing" beds that can transition from acute to skilled nursing.

How technologically ready are California's CAHs? In March 2010, the Rural Health Information Technology Consortium received a grant from California Health and Human Services (Agency) to develop tools and perform pilot studies. Their goal was to assess the technology readiness of five Critical Access Hospitals (CAH) in California to achieve the Meaningful Use measures proposed by the Centers for Medicare and Medicaid Services (CMS).

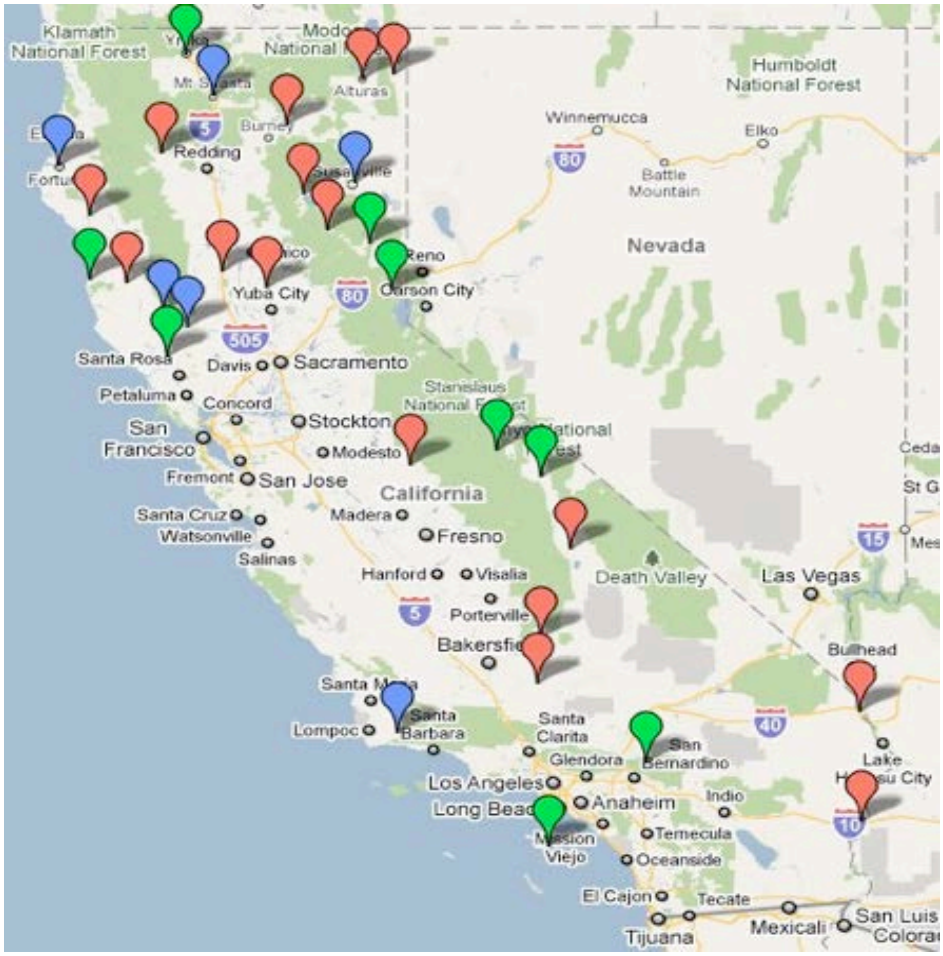
After the pilot was successfully completed, the consortium organized under the California State Rural Health Association (CSRHA). In June 2010, they received a grant from United Health Group to complete assessments on the remaining 25 CAHs and one pending CAH.

Survey Process

The technology assessment consisted of interviewing CAH staff and reviewing their internal documents and reports. Web-based survey questionnaires were emailed to executive, finance, nursing, laboratory, radiology, pharmacy, and IT managers at each facility. Questionnaire responses were reviewed and a site visit allowed follow-up interviews with each manager to understand the hospital's readiness or plans for demonstrating Meaningful Use. Following the site visit, a draft technology assessment was circulated to the CAH staff for review and correction. Further staff comments were then incorporated in the report. All reports were reviewed by the project director and summarized for stakeholder comment. Financial analysis of each CAH was also completed,

including indicators of financial performance, estimating incentive payments and cost-reimbursement for HIT deployment, outpatient laboratory profitability, Medicare patient populations and Medi-Cal share of acute inpatient days.

FIGURE 11. CRITICAL ACCESS CARE HOSPITALS



Blue = hospitals affiliated with parent organizations.
Green = hospitals that are well on their way to achieving meaningful use.
Red= hospitals that have significant challenges to meeting meaningful use.

Results

According to the survey, 10 of 31 CAHs have implemented EHRs, with another six in the process of implementation. The most common barrier cited by CAH chief executive officers (CEOs) to achieving Meaningful Use was funding. Most CAHs struggle financially, with only 13 of the 31 CAHs reporting a profit according to the most recent financial audit information. However, CSRHA projects that most CAHs will receive reimbursement adequate to achieve Meaningful Use.

The estimated total of incentive payments for California's CAHs will be $73 million, compared to total anticipated AIU costs of $55 million. However, these costs do not take into account ongoing operational costs, including HIE and increased information technology staffing costs. According to CSRHA, many rural hospitals, particularly those not affiliated with larger parent organizations, will need technical assistance in order to make the right decisions to achieve and sustain Meaningful Use. Error! Reference source not found. shows the location of California's CAHs and their potential status in achieving Meaningful Use.

1.8.1.5 EHR ADOPTION BY CHILDREN'S HOSPITALS

California is home to eight children's hospitals. Under the Medi-Cal EHR Incentive Program, they will all qualify for incentives regardless of Medi-Cal discharge volume. Based on 2008 data, the children's hospitals are expected to receive an estimated $45 million in incentive payments.

Successful health information exchange is a priority for the majority of children's hospitals. The primary barrier to adopting new EHR technology Is reported to be inadequate funding.

Strategy and Next Steps

In a survey of the eight hospitals conducted by DHCS and the California Children's Hospital Association, six hospitals indicated that they will participate in the hospital incentive program. One hospital, Loma Linda, will apply in conjunction with their main hospital. Another, Oakland Children's, is not sure about participation.

Of the six hospitals who will be participating:

- All six hospitals currently have an operating EHR.
- One hospital believes that it can meet the current Meaningful Use criteria.

1.8.1.6 EHR ADOPTION BY COMMUNITY CLINICS

In September 2010, the California Primary Care Association (CPCA) sought to determine how many clinics have fully implemented EHRs. They surveyed 181 clinic and health center corporations in California about health information technology related issues. One hundred and twenty-seven corporations responded, a 70% response rate. Seventy-five percent of the respondents were FQHCs or FQHC look-alike clinics.

Results

This survey found that *21% of clinic corporations have fully implemented EHRs, 19% have partially implemented EHRs and 60% do not have an EHR*. Eighty-

three percent of the clinics intend to work with its providers to participate in the Medi-Cal EHR Incentive Program, with 73% intending to do so in the first year. Sixty percent of clinics reported a need for additional staff for EHR support in the next two years.

The survey also revealed information about technology products. Two EHR products dominate the marketplace for community clinics and health centers: eClinicalWorks (25%) and NextGen (25%). Sixty percent of organizations that have not yet implemented intend to purchase NextGen, while 24% plan to purchase eClinicalWorks.

Out of 127 respondents, the survey revealed how many are using each of the following types of interfaces:

1) Lab: 73
2) E-prescribing: 25
3) Radiology: 12

When asked what type of information would be most beneficial to exchange, 66% of respondents ranked eReferral and scheduling for specialty care as the most important. Following, in order of importance, was immunization registry, labs, patient summary, and lastly e-prescribing.

Funding

Fifty-two of California's FQHCs have successfully obtained funding from the HRSA Capital Improvement Project grants for health information technology and/or electronic health records. Additionally, there are 13 Health Center Controlled Network grantees in California with nearly $24 million in dedicated funding for health information technology. (See Table 8 below.)

TABLE 8: HEALTH CENTER CONTROLLED NETWORK GRANTEES

Grantee	Grant Number	Program Director	Financial Assistance
ALLIANCE FOR RURAL COMMUNITY HEALTH	H2LIT16580	**Cathy Frey** 707-462-1477 x101	$506,859.00
ALLIANCE FOR RURAL COMMUNITY HEALTH	H2LCS18137	**Cathy Frey** 707-462-1477 x101	$866,031.00
ALTA MED HEALTH SERVICES CORPORATION	H2LIT16834	**Castulo de la Rocha** 323-889-7310	$746,250.00
ASSN OF ASIAN/PACIFIC COMM HLTH ORGANIZATIONS	H2LIT16610	**Rosy Weir** 510-272-9536 x107	$191,250.00
ASSN OF ASIAN/PACIFIC COMM HLTH ORGANIZATIONS	H2LCS18132	**Rosy Weir** 510-272-9536 x107	$1,000,000.00
CLINICA SIERRA VISTA	H2LIT16836	**Stephen W Schilling** 661-635-3050	$1,865,625.00
CLINICAS DEL CAMINO REAL, INC.	H2LCS18168	**Roberto S Juarez** 805-659-1740	$3,000,000.00
COMMUNITY ACCESS HCCN, LLC	H2LCS18174	**John Williams** 415-391-9686	$2,519,875.00
COMMUNITY HEALTH CENTER NETWORK	H2LCS18136	**Ralph Silber** 510-297-0200 x266	$3,000,000.00
FAMILY HEALTH CENTERS OF SAN DIEGO, INC.	H2LIT16855	**Andres Gutierrez** 619-515-2539	$1,865,625.00
FAMILY HEALTH CENTERS OF SAN DIEGO, INC.	H2LCS18161	**Andres Gutierrez** 619-515-2539	$3,000,000.00
GOLDEN VALLEYHEALTHCENTER	H2LCS18131	**Michael O Sullivan** 209-383-1848 x351	$2,998,013.00
REDWOOD COMMUNITY HEALTH NETWORK - REDWOOD COMMUNITY HEALTH COALITION	H2LCS18142	**Nancy O Oswald** 707-792-7900 x216	$2,079,598.00

The Role of 1204a Clinics

Over 200 of non-FQHC clinics in California are licensed as 1204a clinics under state law. These clinics must be non-profit entities that charge patients based on ability to pay, using a sliding fee scale. If the patient can't pay, the clinics can't charge the patient directly for services rendered or for medications, appliances, or apparatuses furnished. These clinics constitute an important component of the state's safety net for the most vulnerable of our population. However, a large number of providers in these clinics may not qualify for Medi-Cal EHR Incentive Program payments due to the inability to count uninsured and other needy patient encounters toward their patient volumes.

1.8.1.7 EHR ADOPTION BY LARGE MEDICAL GROUPS AND INDEPENDENT PRACTICE ASSOCIATIONS

There is a relatively low adoption rate for medical groups and IPAs in California. **The National Study of Physician Organizations**, reporting 2007 data, found *only 32% of medical groups and 6% of IPAs made an EHR available for progress notes,* and even fewer for lists of patient medications (see Table 9). However, looking at electronic access to clinical data, medical groups and IPAs had much better utilization rates, especially for laboratory test results (59%), though less so for a record of prescriptions filled (13%). Twenty-nine percent of organizations reported that providers exchanged e-mail with patients and only 3% allowed patients online access to their EHRs.

TABLE 9. IT CAPABILITIES AND EHRS IN LARGE MEDICAL GROUPS AND IPAS IN CALIFORNIA

	Medical Groups	IPAs
	N=71	N=113
Electronic documentation		
Progress notes	32%	6%
List of patient medications	25%	8%
Electronic access to clinical data		
Laboratory test results	69%	52%
Radiology test results	63%	39%
Specialist referral notes	37%	9%
Emergency dept. notes	42%	19%
Hospital discharge notes	55%	33%
Record of prescriptions filled	18%	10%
Clinical decision support		
Alerts for potential drug interactions	24%	5%
Alerts for abnormal tests	20%	10%
Prompts at time of visit	21%	10%
Physician order entry		
Physician electronic prescribing	32%	17%
Electronic registry for chronic illness		
Diabetes	62%	51%
Asthma	39%	48%
Chronic heart failure	44%	41%
Depression	23%	19%
Electronic connectivity for patients		
Physicians use e-mail with patients	39%	23%
Patients can access part of EMR online	4%	3%
Quality measurement		
EMR used to measure quality	19%	39%

NOTE: National Study of Physician Practices (NSPO2), March 2006–March 2007, including practices with 20 or more physicians.

Commercial HMO contracts

In 2009, the Integrated Healthcare Association (IHA) surveyed 193 medical groups and IPAs in California with at least one commercial HMO contract, requesting that the organization indicate their Electronic Medical Record status. Here are the responses: 28.1% “Fully Operational;” 33.3% “Implementation Underway;” 20.8% “Implementation Planned;” and 15.1% “No Implementation Planned.” Only 2.7% did not respond. (The same question was asked of all 28 reporting units for Kaiser Permanente, and they all responded “fully operational.”)

Pay for Performance
IHA also includes HIT criteria in their pay-for-performance program, and have audited data for measurement years 2003-2009 on several aspects of HIT adoption. In 2009, 62.7% reported having computerized registries; 26.9% electronic prescribing; 53.4% electronic lab results; and 47.2% electronic messaging. Also, 51.8% were able to access clinical notes of other practitioners; 50.3% provided physician reminders for preventive and chronic care; and 31.6% could order lab tests electronically. These numbers do not include Kaiser Permanente.

Managed Care Contracts
In 2010, Cattaneo & Stroud conducted a survey of the California medical groups (excluding Kaiser Permanente) accepting managed care contracts and having at least six primary care providers. The 155 groups responding reported *18% of primary care providers use EHRs.* A relatively high percent of respondents (33%) reported not knowing the rate of EHR use by their providers. The reported rate of use of EHRs by specialists was only 8%. The reported rates of group support for e-prescribing, local HIE, and electronic lab reporting were 57%, 37%, and 41%, respectively.

Although there is current knowledge of EHR use by groups and associations, it is not complete or consistent across settings. For this reason, DHCS has contracted with researchers at UCSF to design a unified survey to be conducted in 2012 and repeated periodically in the future.

1.8.1.8 EHR ADOPTION BY INDIAN HEALTH CLINICS

There are 64 small and independent Tribal Health Programs in rural and isolated communities in the state, which are hard to reach and have high provider turnover. Most do not currently use EHRs. Some, however, use the Indian Health Services' Resource and Patient Management System (RPMS), which is an electronic health information technology solution. This system is used to manage clinical, business practices and administrative information in order to meet stringent Indian Health Services (IHS) reporting requirements, including the Government Performance and Requirements Act (GPRA) reporting.

A network of primary care clinics throughout the state is funded by IHS to provide care to American Indians and other underserved populations as identified in the clinic charter/mission. These clinics can participate in Medi-Cal as a Tribal Health Provider (THP) funded under the authority of Public Law (PL) 93-638, 25 USC 450 et seq., FQHC, Rural Health Clinic (RHC), or Community Health Center, if they meet all of the federal and state statutory requirements for each provider type.

The History of FQHC and THP

In 1998, DHCS implemented a Memorandum of Agreement (MOA) between the federal IHS and the Health Care Financing Administration (HCFA). HCFA was later renamed the Centers for Medicare & Medicaid Services (CMS). Funded under PL 93-638, the MOA established a new provider type and reimbursement rate for services provided to Medi-Cal recipients at tribal health clinics and also established the THP provider type. Clinics subsequently had the option to change their provider type. Although they did not change operations, most of the tribal health clinics changed their provider status from FQHC to THP at that time to take advantage of the new reimbursement system. As of March 2010, there were 16 FQHCs and 48 THP Indian health clinic providers enrolled in the Medi-Cal program.

THP clinics are operated by tribes and tribal organizations as primary care clinics in California under the authority of PL 93-638 and funded by the IHS to continue to provide a significant level of health care services at no cost to individual American Indians. These services meet the description of services provided to needy patients established in 42 CFR 495.306; the THP clinics have requested to be considered as FQHCs for the purposes of the Medi-Cal EHR Incentive Program. In compliance with CMS' recently published FAQ on this issue, DHCS will treat the THP clinics as equivalent to FQHCs for this purpose.

1.8.2 HEALTH INFORMATION EXCHANGE LANDSCAPE

INTRODUCTION

California's health information exchange (HIE) landscape is characterized by a wide range of regional initiatives supported by our HIE Partner at the state level. In 2012, the HIE landscape in California includes a vast array of community initiatives with broad sets of exchange partners, as well as private enterprise initiatives operating in integrated health systems, hospitals, and physician groups. Initiatives span multiple counties, locations, partners and facilities and are spread across Northern and Southern California, with some enterprise health information exchange organizations (HIOs) extending into neighboring states. Initiatives vary in their degree of maturity and stage of development when it comes to actual or planned exchange of health information among affiliated and unaffiliated partners.

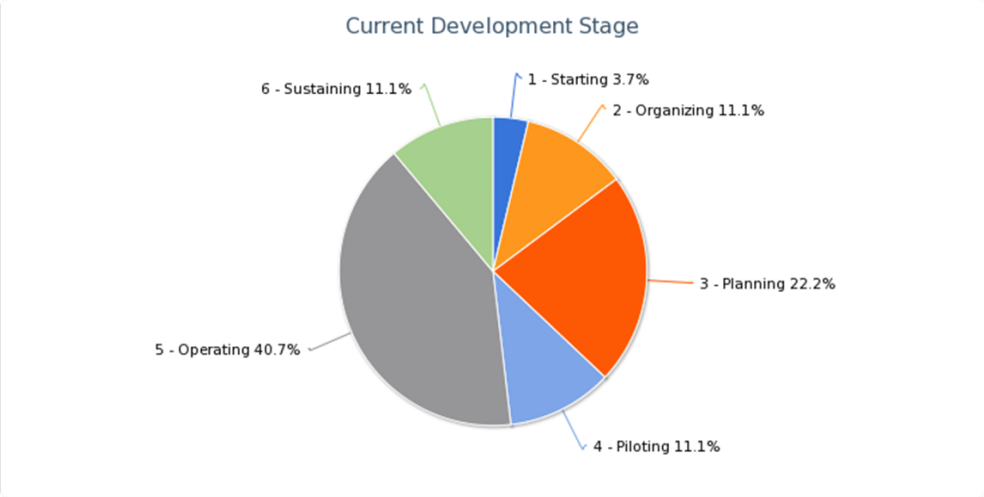
Since 2011, our former Partner has been tracking self-identified community-based health information exchange organizations through its HIE Community of Practice (CoP). However, there has been insufficient information available about the activities of enterprise or private HIOs in California. To provide a more complete representation of HIE in the state, our Partner recently commissioned Top Tier Consulting to conduct a capacity and capability assessment of 13 existing community HIOs and 14 leading private or "enterprise" HIOs in the state to: 1) gauge community and enterprise HIE

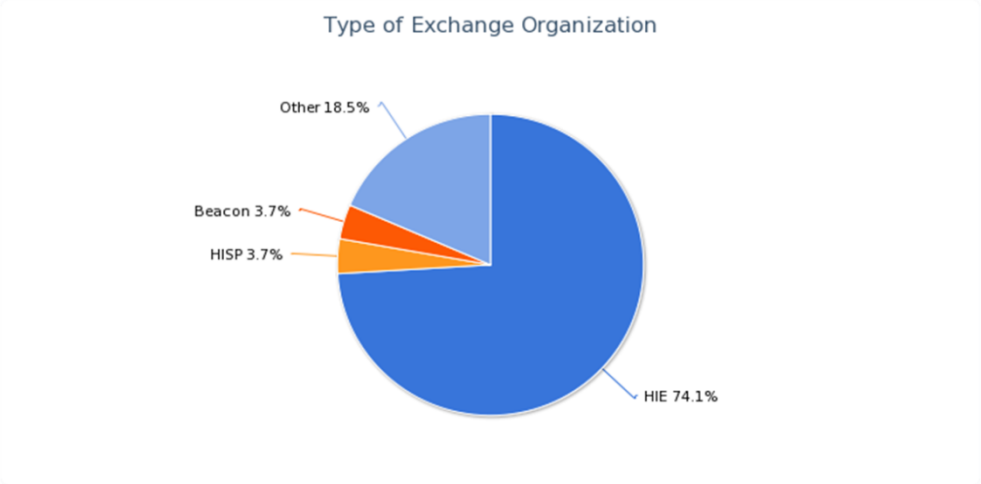
“supply” in California and 2) document an accurate current and future view of exchange capabilities and capacities covering the majority of exchanges across the state.

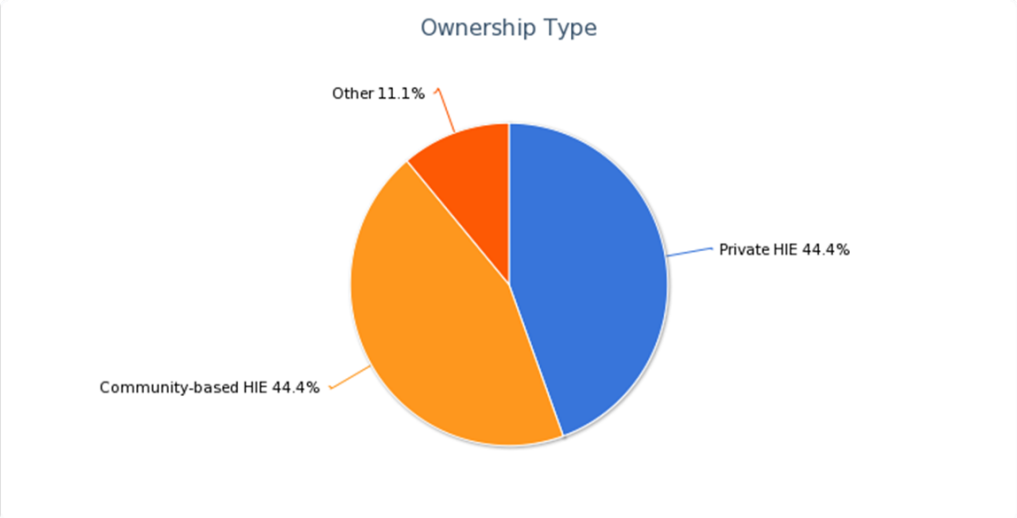
The results from that assessment, along with other information collected on California HIE activity including the current state of e-prescribing, electronic laboratory data exchange, and public health reporting is presented throughout this section.

Summary characteristics of the community and enterprise organizations examined by Top Tier are summarized in the figures below:

FIGURE 12. CHARACTERISTICS OF COMMUNITY AND ENTERPRISE HIES







1.8.2.1 GEOGRAPHIC COVERAGE OF HIE ACTIVITY

California has 58 counties that spread 1040 miles north to south and 560 miles east to west. These areas encompass wide variability in topographies, healthcare delivery models, economies, and populations.

As indicated in the table and map below, California is well on its way to providing HIE options for providers in the majority of counties in the State. Geographic coverage is extensive, but large gaps remain. As is discussed further below, community HIOs generally align with county geographies, while enterprise HIOs tend to choose specific geographies that support patients and providers in their own systems and medical trading areas.

The specific coverage area and geography of any given HIE initiative is impacted by a number of factors including the local competitive environment, the level of public health involvement in providing care or financing, patient demographics and migration patterns, as well as the healthcare financing structure in the markets considered.

The following table and figures show HIO coverage in California by the organizations participating in the Top Tier assessment.

TABLE 10. HIO COVERAGE IN CALIFORNIA

Bay Area - Central and North	HealthShare Bay Area, ConnectHealth Hill, Kaiser, John Muir, Sutter
Sacramento Valley/Sierras	CAReHIN, ConnectHealth Dignity, Kaiser, Sutter, UC Davis
North - Coastal/Agricultural	Redwood MedNet Dignity, St. Joseph, Sutter
North – Inland/Border	CAReHIN, Redwood MedNet Dignity

FIGURE 13. COMBINED ENTERPRISE AND COMMUNITY HIE ORGANIZATIONS (2012)

Community HIOs

By the end of 2012, over 75% (44 of 58) of counties in California will have Community-based HIOs in the planning or operating stages. These counties encompass most of the urban areas in the state. Four large HIOs that expected to begin implementation in 2012 stand out. These initiatives will cover

much of major urban areas of San Francisco, Alameda, Contra Costa, Los Angeles, Orange, San Diego, Riverside and San Bernardino counties. Community-based HIOs are also serving counties in rural areas with specific needs, strong local support or a current arrangement, such as telemedicine, with the provider community in their area. By the end of 2013, the total number of counties with one or more Community-based HIO may increase to as much as 88% of counties (51 of 58) in California.

Community-based HIE initiatives tend to align along county lines. While not always the case, affiliations with County Health departments can provide a foundation for community-based HIOs in a given county or group of contiguous counties. Generally, entities that benefit the most are arranged in county definable trading areas. This can provide a platform on which a complete and portable patient record could be maintained.

Enterprise HIOs

By the end of 2012, at least 60% (35 of 58) of counties in California will have enterprise HIOs with some exchange capabilities. Enterprise HIOs are primarily associated with multi-state and intrastate IDN's, hospital systems and large medical groups. A few standalone hospitals have established HIE capability, but due to the cost associated with technology, testing, interfaces and maintenance, these providers tend to gravitate to the Community-based initiatives. As will be discussed further below, for many enterprise HIOs, exchange is limited to intra-organizational exchange as opposed to exchange with unaffiliated providers and entities.

Focus is on most tightly integrated providers and patients. Patients and providers with the closest affiliation with the enterprise tend to dominate the focus of the enterprise HIE initiatives at this time. These providers also tend to be on a more common set of technology solutions than unaffiliated providers in the same area. Thus, the largest base of patients will enable the attainment of critical mass most efficiently, with the fastest impact to the care of the largest group of patients. A negative result of this philosophy is that the provision of fragmented or incomplete data erodes confidence in the data by the treating professionals, thus reducing the value of the exchange and raising the already high concerns about liability for treatment errors.

Medical trading areas dictate geographic selection rather than county lines. Medical trading areas (MTAs) dictate many decisions related to HIE coverage areas. Enterprise HIOs tend to be concerned primarily with facilitating the provision of the most appropriate data set to providers delivering care in the medical trading "or service" area, rather than having a county specific focus. This is driving the enablement of exchange capabilities with the participant hospitals, employed and affiliated physicians/specialists, inpatient and outpatient labs, radiology and surgery centers and other owned or contractually associated points of care. For tightly integrated IDN's or capitated, delegated

arrangements, this is a fairly straight-forward process. However, for the multi-state, multi-region or enterprises with multiple technologies, this becomes a complicated, expensive integration effort.

An additional challenge for these organizations is that patients do not necessarily reside in or receive care in the specific trading area of a particular organization. For many reasons, patients tend to exercise choice and are influenced by a range of factors in seeking care from other sources. Patients of other unaffiliated providers may also choose to access care from the enterprise's affiliates for reasons of quality, need or emergency.

Needs and objectives to support new models of care and better coordinate care are advancing the creation of enterprise HIOs. Improvements in quality and efficiency of care are primary drivers for these organization and the emergence of ACO's is driving much of the strategy for HIE participation at this time.

Rural and Underserved Regions

There are still large gaps in coverage in some areas of the state and within counties. While community or enterprise HIOs exist in the majority of counties as "an option" for providers to access, it is usually the case that only a portion of that county's providers are currently connected and using exchange services at this time. Broad participation is not always ensured. In 14 counties, there is currently *no* established or planned community HIE activity, which accounts for approximately 20% of the state population and the majority of critical access hospitals. As expected, these counties are in some of the most rural areas of the state, tend to lack resources for technology adoption or are in areas with a highly fragmented delivery system. They also carry their own unique set of financial, broadband and patient migration issues. These counties include: Siskiyou, Lassen, Shasta, Tehama, Colusa, Yolo, Placer, El Dorado, Calaveras, Tuolumne, Mono, San Benito and Monterey. Surprisingly, Sacramento and Santa Clara counties have no planned Community-based HIE efforts underway at this time.

Closing the gap is proving to be slow and difficult. Other obstacles hindering more rapid HIE progress in rural areas include:

- The diffuse nature of care delivery
- Large numbers of independent practices, small rural clinics and hospitals with varying EHRs/EMRs in place which hinders ease of interoperability
- Limited funds for paper-based provider practices to adopt EMRs
- Limited broadband service
- The costs of outreach, negotiating data sharing agreements and building and implementing point to point interfaces

Top Tier interviews indicate support for community HIOs to expand services into these underserved areas. In some instances this is as simple as extending use to new users. In other instances, this will require the extension of HIOs' services and infrastructure into new geographic areas. In 2013, there are expansion plans scheduled for some community HIEs to add coverage to seven of the counties currently lacking an HIE option for providers, which would reduce the current white space by about half (counties include: Shasta, Tehama, Colusa, Yolo, Sierra, Calaveras and Tuolumne).

Data Trading partners and exchange participants

HIE initiatives exchange clinical information with a variety of trading partners and stakeholders including: Health Plans, Hospitals, Long Term Care/Rehabilitation Facilities, PCPs, Specialists, Other Clinicians, Community Clinics, FQHCs, County Public Health, Labs and Radiology Centers, Registries and Other HIEs/HISPs.

Enterprise HIOs

Enterprise exchanges focusing on internal exchange. Initiatives are focused on connecting their internal EMRs between hospital, physicians, clinics and other owned facilities and care providers. In addition, some EMRs vendors are developing "hubs" to enable access to patient records when providers are using the same vendor platform.

The following table represents aggregated numbers of current and planned trading partners for enterprise HIOs.

TABLE 11. ENTERPRISE HIOS

Enterprise HIOs (n=12) Estimated Number of Trading Parterner per Year	Health Plans	Hospitals	PCP Practices	PCP Counts	Specialist Practices	Specialist Counts	FQHC	Comm'ty Clinics	Public Health	Rehab/ LTC	Labs/ Rad	Other HIEs/ HISPs
2012	3	147	135	12847	10	1000	0	1	30	6	239	6
2013	2	161	345	18443	60	1680	0	6	35	10	436	17

Enterprise exchanges are focusing on regional exchange. Private enterprise continues to be concerned about the legal issues associated with information exchange and therefore some organizations are limiting not only there regional reach, but also the partners with whom they will exchange information.

Progress is accelerating. Organizations have made significant progress in connecting internally using their EMRs and are now focusing on finding the best way to connect providers to support different models of care such as Accountable Care Organizations, Patient Centered Medical Homes and increases in the importance of Coordination of Care.

Community HIOs

Community HIOs encompass a wider set of stakeholders. Community-based organizations tend to focus on a broad set of stakeholders, rather than the "internal" or close affiliate model of the Enterprise HIEs. This is driven by the nature of the stakeholders. These are typically Integrated Delivery Networks with points of care or data that are not under their direct control; loose or unaffiliated providers and hospitals; critical access hospitals; providers with multiple affiliations; independent and multiple-site labs, radiology and medical clinics; county public health clinics and Federally Qualified Health Centers.

Three models for stakeholder participation have emerged. HIEs have formed around models for connecting stakeholders in order to solve a specific problem or set of problems;

- Connecting safety-net hospitals and clinics to communities.
- Connecting rural hospitals and clinics to a diffuse provider community.
- Connecting coexisting, independent integrated systems together.

Organizations have ambitious plans for connecting trading partners. Each expects to connect the vast majority of providers and points of care in their regions. Two HIEs, Inland Empire and SD Beacon, are testing this premise, as they went live in the 1st quarter of this year.

Planned trading partner estimates by community HIOs are aggregated below in Table 12:

TABLE 12. COMMUNITY-BASED HIOS

Community-based HIOs (n=14) Estimated Number of Trading Parterner per Year	Health Plans	Hospitals	PCP Practices	PCP Counts	Specialist Practices	Specialist Counts	FQHC	Comm'ty Clinics	Public Health	Rehab/ LTC	Labs/ Rad	Other HIEs/ HISPs
2012	11	65	65	4361	52	635	69	85	22	10	87	37
2013	14	97	42	5433	4	595	91	100	34	20	96	123

The majority of HIEs in operation are making slow progress connecting with their stakeholders and participants. The process of negotiating agreements and contracts, engaging with end user organizations and building the necessary infrastructure and interfaces with stakeholder organizations is more difficult, time-consuming and costly than first anticipated.

Access to skilled resources is an issue. As has been discussed elsewhere in this document, most HIEs run with very lean staffing levels. While this is testament to the dedication of the individuals involved, it can cause problems in terms of the capacity to make progress and deliver developments that are of interest and relevance to stakeholders. Gaps in resources are usually met through part time resources, vendor resources or volunteers from stakeholder organizations as an "in kind" contribution.

Collaboration between Community-based and Enterprise HIOs

Enterprise organizations are beginning to forge alliances with community-based initiatives. These partnerships allow them to take advantage of economies of scale connecting to unaffiliated services such as local, regional and national laboratory and radiology services, emergency departments, clinics, registries and public health organizations that are in their medical trading area.

Enterprise initiatives have tended to focus exclusively on the movement and care of their patients within their health systems. However, as organizations make progress in connecting internally using their EMRs, they become ready to focus on finding the best way to connect providers to support different models of care such as Accountable Care Organizations and Patient Centered Medical Homes.

Examples of enterprise and community-based HIE collaboration include:

- John Muir Health and Sutter Health with HealthShare Bay Area
- St Joseph's Health System with OCPRHIO, RWMN and NCHIN
- SHARP, Scripps, Kaiser Permanente, and UCSD with San Diego Beacon Community

These partnerships enable enterprise HIOs to take advantage of economies of scale connecting to unaffiliated services such as local, regional and national laboratory and radiology services, emergency departments, clinics, registries, and public health organizations that are in their medical trading area.

Agency strongly supports connecting safety-net and Medi-Cal-oriented providers with advanced health systems and hospitals in an effort to minimize the emergence of a digital divide in the California healthcare delivery system.

Conclusions

Enterprise and community HIOs have common challenges in establishing relationships with trading partners. Trading partners need to have mutuality of interest in sharing health information, usually around patients or populations in common. Concerns were expressed regarding lack of trust in other organizations not only from an organizational capability but also in some instances in their motives and approach to wanting to share data. Another concern revolves around the legal issues associated with liability from using other organizations' data. It raises questions about the legal structure of the exchange and how risk may be limited or underwritten.

These are complex issues and the HIEs and their stakeholders require expert guidance as they try to work out the best structures for their organization. This role could be well served by the HIE Partner.

Other findings:

- Enterprise HIEs will continue to focus their attention mainly on internal connectivity of EMRs between affiliated providers, hospitals and labs. This is a prerequisite to exchange outside of their infrastructures.

- Where EMRs are sourced from common vendors, enterprises will look to connect EMR to EMR using hubs before looking to connect outside through a Community exchange.

- Smaller enterprises will begin to look at Community HIOs as their only way to connect outside their infrastructures. This could help drive adoption on by smaller general hospitals, rural hospitals, smaller hospital systems and LTC/SNF facilities.

- Consolidation of some HIOs is in the planning stage. This is particularly in HIEs that share geographies or stakeholders with other more established or funded initiatives.

- Community HIOs have plans to connect to other community HIOs, but progress is slow due to the fact that each organization is primarily focused on implementation with their own participants at this stage.

- The workforce development program is not being utilized by any of the interviewed organizations. These resources tend to accept lower pay in order to reestablish themselves in a new industry and could serve to increase organizational bandwidth at a lower cost than either contract or direct hire staff. The need for increased supervision and/or training appears to be a limiting factor. Our HIE Partner could serve as a facilitator of these resources or use them internally to support programs.

1.8.2.2 TYPES OF DATA EXCHANGED AND HIE SERVICES OFFERED

The findings of the assessment for CeC suggest significant variance in the scope and approach to delivering information exchange, and in the types of transactions that are being supported by different HIOs. We'll identify these aspects in more detail below.

Community HIOs

Support for the Priority requirements of Meaningful Use. Community HIO respondents were asked to state which aspects of Meaningful Use Stage 1 they would be seeking to support. These are summarized below.

- **E-prescribing** – Five HIOs said they were either supporting or planning to support. The other seven either did not respond or indicated they had no plans to support e-prescribing.

- **Structured Laboratory Results** – Ten HIOs said they either were or were planning to support the communication of structured laboratory results.

- **Patient Care Summaries** – Most HIOs said they will be supporting the exchange of patient care summaries. Only three did not indicate their intentions.

- **Immunizations** – Nine HIOs said they would support immunization records. Of these two were already doing it.

- **Syndromic surveillance** – Six sites said they plan to support Syndromic surveillance although none is doing this at this time. One HIO said it had no plans to support this and the other five did not indicate their intentions.

- **Clinical Quality Reporting** – Only three sites said they had plans to support clinical quality reporting. Three sites said they had no plans to do this and the other six did not indicate their intentions.

The counts of community based HIEs providing or planning to provide specific transactions is depicted below in the following tables:

TABLE 13: EXCHANGE TRANSACTION TYPES OF COMMUNITY-BASED HIOS

	Total # of Community-based HIOs offering (n=12)		Total # of Enterprise HIOs offering (n=11)	
Transaction Type	**2012**	**2013**	**2012**	**2013**
PIN Priority Areas:				
Lab Results Delivery	11	13	8	8
Patient Care Summaries	8	10	11	11
Immunizations (Public Health)	7	8	1	3
ePrescribing	5	5	4	4
Syndromic Surveillance (Public Health)	5	7	1	3
Other Data Types:				
Referrals – Request	4	8	3	4
Referrals – Scheduling	3	3	2	2
Referrals - Specialist Reports	4	5	2	3
Transcriptions	7	9	6	6
Discharge Summaries (ADT)	8	9	7	7
Ambulatory Order Entry	3	6	6	7
Radiology Results Delivery	8	10	8	7
Disease Registries	4	7	1	4
Medication Reconciliation	1	5	3	3
Image Exchange	4	6	3	3
Reminders/Alerts	1	2	3	4
Patient Access PHR	2	9	3	7
Advance Directives	1	3	0	1
Analytics	2	6	2	3
EMR-Lite	5	6	1	2
Eligibility Verification	2	2	1	1
Pre-Certification	1	1	2	2
Credentialing	1	1	0	0
Clinical Quality Reporting	2	5	2	3

Of the fourteen community HIEs interviewed by Top Tier, six are in some stage of live operation. The remaining six are still in the planning or procurement stage; see the following page for more explanation.

TABLE 14: COMMUNITY HIE TECHNOLOGY MAP

Community-based HIO	Vendor	Functionality	Interfaces
CAReHIN	Mirth	Connect/Interface Local data repository	EPIC
Connect Health	None		
EKCITA (E. Kern County)	Browsersoft Pentaho	MPI/Longitudinal Health Record (CCD) Population Health	NextGen Centiricity NwHIN
HealthShare Bay Area	Selection not publicized at time of report	MPI Remainder in negotiations	EPIC
IEHIE	Orion	Integrator/ClinicalPortal/ Aggregator/CDR/Prov Dir./ Image viewer Secure messaging	TBD Pre-purchased 600 interfaces
LANES	Mirth Initiate	Connect Interface MPI	TBD
NCHIN	Mirth IRIS	Connect Interface Referral engine	HL7 - Labs IRIS - IRIS
OCPRHIO	Mirth	MPI/RLS Aggregator, Resu;ts viewer	TBD
RAIN Central Coast	Mirth	Connect/Interface/Data Aggregator Secure messaging	Telemedicine providers - Redwood MedNet
Redwood MedNet	Mirth	Connect/Interface Match/MPI-CDR	Various
Santa Cruz HIE/Physicians Medical Group SC	Axolotl Mirth Atlas	MPI, Prov Dir, RLS, Auth/Consent Integration ADT	Various
SD Beacon	Optum/Axolotl	HIE/CDR	Various EMS Sharp EMR
Shasta Health Collaborative	Proxmear	Assessment/Referral portal	Any affiliated provider
Tulare Kings FMC	eClinicalWorks EMR	Interface/EMR PACS based image exchange application	other eCW users

The following table provides a general overview of the various planned and live technology solutions selected by the Community HIOs:

TABLE 15. COMMUNITY HIE TECHNOLOGY MAP

Community HIO	Vendor	Functionality	Interfaces
CAReHIN	Mirth	Connect/Interface Local data repository	EPIC
Connect Health	None		
EKCITA (E. Kern County)	Browsersoft Pentaho	MPI/Longitudinal Health Record (CCD) Population Health	NextGen Centiricity NwHIN
HealthShare Bay Area	OptumInsight	MPI Remainder in negotiations	EPIC
IEHIE	Orion	Integrator/ClinicalPortal/ Aggregator/CDR/Prov Dir./ Image viewer Secure messaging	TBD Pre-purchased 600 interfaces
LANES	Mirth Initiate	Connect Interface MPI	TBD
NCHIN	Mirth IRIS	Connect Interface Referral engine	HL7 - Labs IRIS - IRIS
OCPRHIO	Mirth	MPI/RLS Aggregator, Resu;ts viewer	TBD
RAIN Central Coast	Mirth	Connect/Interface/Data Aggregator Secure messaging	Telemedicine providers - Redwood MedNet
Redwood MedNet	Mirth	Connect/Interface Match/MPI-CDR	Various
Santa Cruz HIE/Physicians Medical Group SC	Axolotl Mirth Atlas	MPI, Prov Dir, RLS, Auth/Consent Integration ADT	Various
SD Beacon	Optum/Axolotl	HIE/CDR	Various EMS Sharp EMR
Shasta Health Collaborative	Proxmear	Assessment/Referral portal	Any affiliated provider
Tulare Kings FMC	eClinicalWorks EMR	Interface/EMR PACS based image exchange application	other eCW users

Key findings

Hosted versus managed service options. ASP and SaaS models are the dominant approach to service provision for Community based HIOs. It is expected that these approaches provide lower ongoing costs, supporting a subscription revenue model.

HIE component structure. Community HIEs have taken one of three main approaches to configuring their technology:

- Single strategic solution providing main HIE components. Examples here include Browsersoft, OptumInsight, and Orion.

- Selecting best of breed technologies to meet the key planned requirements. Building solutions in this way requires that core technologies be identified and tends to support those environments where there is a need for strong integration between disparate systems. Mirth is frequently cited as a core technology provider for interfacing/integration technology. Initiate is cited as the most common an EMPI technology.

- Relying on an EMR based approach supporting exchange within a close community of organizations using the same EMR. Two examples of this are Epic users, using Epic Care Anywhere; eClinical Works users, using eHX Hub.

Delivery methods vary among solutions (in order of increasing difficulty) from:

- a simple viewer,

- viewer with ability to consume selected data into EMR,

- delivery of interfaced, cross-walked and/or structured data,

- full interoperability with standardized and harmonized data.

Those that are taking the approach of a single strategic solution are relying on their vendor to ensure all priority capabilities are being supported including the need to build interfaces with other source and target systems.

Interface/integration engine. The majority of HIE's recognize the need for integration and interface support with seven out of the twelve Community HIE's either already using or planning to use an integration/interface engine. The cost of point to point interfaces is seen as one of the major barriers to HIE expansion and this technology helps to defray some of these costs as well as providing flexibility to support different messaging standards that may be required as HIEs develop.

Patient Identity Management. The ability to uniquely and accurately identify patients is seen as a fundamental requirement not only for individual healthcare organizations but certainly for organizations involved in health information exchange. Five of the twelve Community HIEs cited use of Enterprise Master

Patient Index technologies with others having this technology embedded in other systems such as their EMR or HIE engine.

Provider Directory. Five HIEs said they had plans for or were already using a provider directory.

Data exchange standards. There appears to be a lack of consistency in the use of standards to support data exchange. Some of this may be driven from the inability of applications to support specific standards; some may be driven from a historical preference for a specific standard, such as the support for using the CCR over the CCD or CDA standard; some cited their concern about the fragility of a standard and therefore their concern about committing to its use.

A number of HIEs cited use of HL7. Not all were specific about which version and also raised issues about how internal data exchange may use different standards from external data exchange.

Concern was raised about the fragility of some of the standards and that in some instances it was necessary to use non-standard means to import or export data.

A major concern in this area was the inability of EMRs to receive data being sent from other systems and a perceived unwillingness of vendors to cooperate in these initiatives.

Semantic interoperability. Overcoming this barrier is critical to enabling the connecting of not only disparate technologies, but also varied implementations of the same vendor solution.

Enterprise HIOs

Enterprise HIEs have taken a fundamentally different approach to setting up their technology platform and have either built on their EMR and used its exchange capabilities, or have procured an HIE engine to drive their exchange.

Six of the Enterprise HIEs are working with HIE Engines. The main technologies here are OptumInsight, dbMotion, Medicity, MobileMD, Interhealth and RelayHealth.

The other six Enterprise HIEs are using their EMRs to facilitate exchange using an EMR Hub or Hub/HIE equivalent. These include NextGen and Epic.

Integration technologies used by Enterprise HIEs include Cloverleaf, Mirth, Apixio, Relay Health Sybase Biztalk, Forward Advantage, Atlas and dbMotion.

Some have separate MPI technologies. These include Initiate and OptumInsight.

Those sites using Epic are confident that they will be able to use Epic's Care Anywhere as a means of exchanging data with other Epic sites. NextGen users will use the NextGen IE as their exchange hub.

The following table represents the various technologies used or selected by Enterprise HIOs:

TABLE 16. TECHNOLOGIES AND ENTERPRISE HIOS

Enterprise HIO	Vendor	Functionality	Interfaces
Dignity Health	Cerner Mobile MD MedSeek Axway	EMR Internal HIE Patient portal Batch file processing	Enterprise Veterans Admin EPIC (Connect)
Healthcare Partners IPA	NextGen Local	EMR Clinical data repository	Enterprise Allscripts, EPIC, IDX
Hill Physicians	NextGen Relay Health	EMR MPI Interface (external)	Surescripts
Hoag Health System	Allscripts Medicity	EMR Novogrid (drop box/exchange) Proaccess (Longitudinal Health Record) Meditrust (MPI,RLS,Gateway, Prov Dir Aetna (Clinical Decision Support tool)	eClinicalWorks, NextGen, Allscripts
Huntington Hospital	Meditech dbMotion Initiate	EMR Integration, Virtual Health Record portal, Physician portal, CCR/CCD repository MPI	Allscripts
John Muir Health	Relay Health/ Cloverleaf	MPI/Integration	EPIC
Kaiser Permanente Health Connect	EPIC	EMR Care everywhere	NwHIN only
Marin Health Network	TBD		
Memorial Care Health System	EPIC NextGen Initiate	EMR EMR MPI	
San Mateo Medical Center	Siemens eClinicalWorks Apixio	EMR EMR Interface portal	
Sharp HealthCare	dbMotion Initiate	EMR MPI	Orion
St. Joseph Health System	Meditech Forward Advantage Initiate Atlas Sybase	CCD exchange Data Express/Interface MPI Labworks interface Biztalk - Meditech/other integration	Allscripts, NextGen, Emdeon, eClinicalWorks)
Sutter Health	EPIC Initiate Relay Health	EMR MPI Interface (external)	Surescripts, Allscripts, Atlas, eHealth Global
UC Davis Medical Center	EPIC	EMR Interconnect interface	Surescripts, Allscripts, Atlas, eHealth Global

Support for the Direct Project

Only five HIOs specifically stated their planned or actual support for the Direct Project. Of the five, none is currently exchanging data by secure email using Direct protocols. Four HIOs said they had no plans to implement Direct. In fact, Direct is almost unanimously seen by organizations as an incomplete solution and therefore is not in their plans. Most agree, however, that it would serve as a solution for the rural areas with loose or no affiliations to other HIOs and where there is also limited funding available to enable exchange. Other means of email exchange are taking place on a more informal basis among known entities.

1.8.2.3 HIE PARTNER SUPPORT: EXPANSION GRANTS AND NEW FUNDING OPPORTUNITIES

The HIE Partner plays a key role in coordinating and supporting local exchanges. A significant portion of the Partner's funding through the ONC's State HIE Grant funds is allocated to these regional efforts to expand their capability to support Meaningful Use and address ONC exchange priorities outlined in Program Information Notice 001 & 002 (ONC-PIN-001, ONC–PIN-002). Multiple community HIEs participate in the former Partner's governing bodies: two seats on the Board of Directors are reserved for operational HIEs and others are represented on the former Partner's Advisory Groups.

In 2011, CeC awarded five HIE Expansion Grants totaling $3.1 million dollars. These grants went to HIE organizations throughout California to support the expansion of HIE capacity and the achievement of Meaningful Use by participating Eligible Providers. Awardees included LANES, OCPRIHO, Redwood MedNet, NCHIN, and EKCITA. All grantees report quarterly metrics on levels and types of exchange.

<u>New Grant Programs</u>

Agency is offering four new grant opportunities directed toward HIE initiatives and providers represented in the table below. A call for letters of intent was released in May 2012 and proposals will be reviewed over the summer. Each of these new programs will require awardees to address ONC PIN priorities. These are described in greater detail in section 1.9, Strategy to Meet Meaningful Use.

CeC also leads an HIE Community of Practice (COP) to provide a forum to share ideas, best practices, and resources across regional and state-level HIE activities. COP webinars are help monthly, with some in-person meetings occurring throughout the year. Currently, there are 20-30 consistent participants in the COP. Some recent topics include the results of the HIE survey, ONC

priorities for exchange, and establishing trust through effective governance strategies.

San Diego Beacon Community
The ONC established 17 Beacon communities across the country intended to increase the adoption of Health Information Technology and to encourage innovation. The San Diego Beacon Community represents California in this initiative, and was awarded a grant of $15.3 million over three years.

A key aim of the Beacon program is to measure outcomes during the three-year period resulting from innovations in the use of health IT and community-wide HIE. The intention in San Diego is to evaluate how technologies improve healthcare.

Four key measures have been established to assess improvements in care quality, population health, and cost-efficiency and effectiveness in healthcare delivery. The measures identified are:

- Reducing unnecessary hospital readmissions.
- Improving childhood immunization rates.
- Enhancing the care of heart attack patients.
- Reducing unnecessary computed tomography (CT) scans.

The San Diego Beacon project places a high priority on ensuring that their internal systems are capable of supporting national standards for the exchange of information.

1.8.3 E-PRESCRIBING

Increased electronic processing of prescriptions is driven by prescriber and pharmacy adoption of e-prescribing. In order for e-prescribing to be a success, practices and pharmacies need to be prepared.

Table 17 displays data on e-prescribing adoption in California from 2007 to 2010. Surescripts statistics are used as the main source of data for each year in the table; the second column for 2010 combines data from Surescripts, Kaiser Permanente, and Veterans Affairs, and provides a more accurate representation of the full extent of e-prescribing adoption in California.

California denominators used to calculate the 2010 measures are as follows:

Office-based physicians:	Approximately 78,000
Patients:	Approximately 38 million
Pharmacies:	Approximately 5,465

TABLE 17: E-PRESCRIBING ADOPTION IN CALIFORNIA

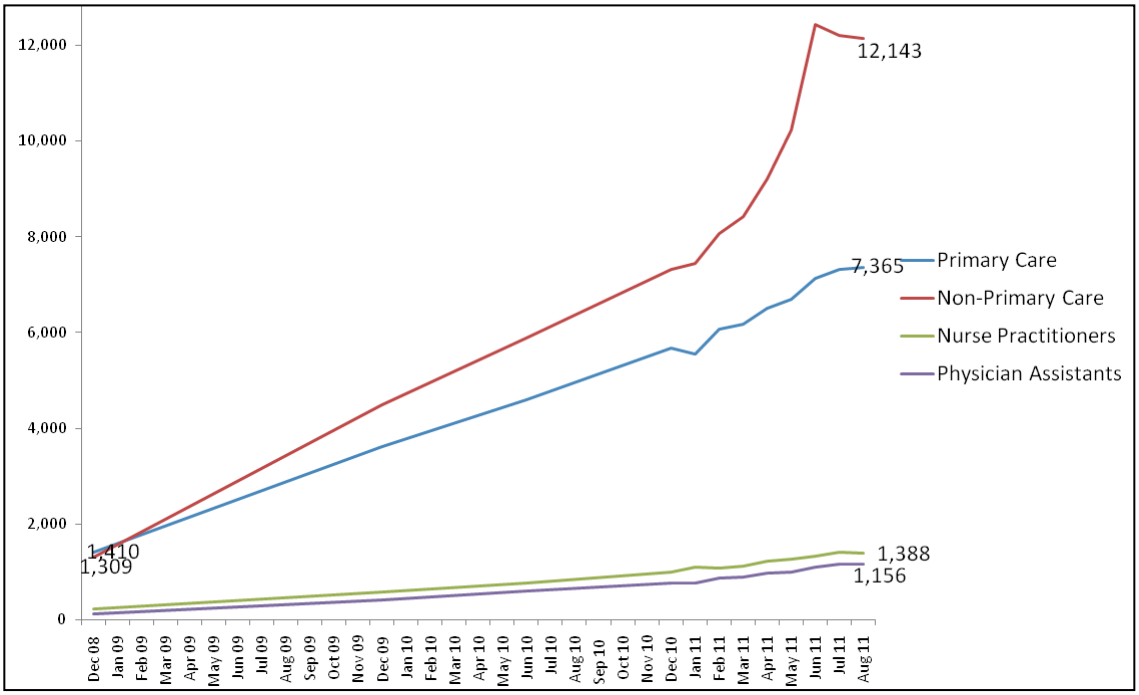
MEASURES	YE2007 Surescripts	YE2008 Surescripts	YE2009 Surescripts	YE2010 Surescripts	YE2010 Surescripts, Kaiser, VA
ADOPTION					
% of Physicians Electronically Routing Prescriptions	3%	6%	13%	23%	25%
% of Patients with Available Prescription Benefit Information	37%	40%	47%	64%	72%
% of Patients with Available Prescription Histories	N/A	40%	47%	64%	72%
% of Total Community Pharmacies Activated for e-prescribing	72%	74%	86%	81%	90%
% of Independent Pharmacies Activated for e-prescribing	N/A	N/A	N/A	75%	75%

*Data from Surescripts, Kaiser Permanente, and the Department of Veterans Affairs

Adoption Among Prescribers

Currently, there is an estimated 26,000 electronic prescribers in California enabled through the Surescripts network. In 2010, approximately 18,000 were enabled through Surescripts; 23% of those physicians routed prescriptions electronically (Table 17). According to aggregated data from Surescripts, Kaiser Permanente, and the Veterans Affairs, the total percentage of physicians e-prescribing at the end of the 2010 was slightly higher at 25%.

FIGURE 14: TOTAL E-PRESCRIBERS IN CALIFORNIA



* Data from Surescripts

**Note: Primary care includes all providers self-identifying as self-reporting as a general practitioner, family practitioner, pediatrician, or obstetrician gynecologist. Nurse practitioners and physician assistants may also be included in primary care and non-primary care specialties, depending on their self-reporting. The denominator of office-based physicians was based on SK&A data.

Adoption Among Pharmacies

Community Pharmacies

According to Surescripts, community pharmacies include all pharmacies self-reporting a pharmacy class of "chain," "franchise," or "independent," and a dispenser type of "retail," "HMO pharmacy," "mail order," "clinic pharmacy," "specialty pharmacy," or "unknown." In 2009, 86% of California's 5,241 community pharmacies were connected for e-prescribing. This percentage dropped to 81% in 2010, which is either due to a greater decrease in connected pharmacies or a greater increase in total community pharmacies in California compared to the previous year.

Chain Pharmacies

California is home to 3,402 chain pharmacies.[9] A chain pharmacy is defined as being part of a chain of four or more pharmacies operating in a retail setting

[9] Retail Pharmacy Count by State. Hayes Directories. Apr 2011. Accessed on July 21, 2011. http://www.hayesdir.com/PCOUNT.HTML

other than in supermarkets or mass merchandise stores.[10] Chain pharmacies have more robust technical support for addressing e-prescribing barriers compared to independent pharmacies. According to Surescripts, Siskiyou and Trinity Counties have 60-70% connected community pharmacies. Alpine County does not have any pharmacies enabled through Surescripts. The remaining counties in California have 70% or more of their community pharmacies connected. With the exception of Alpine County, prescribers have access to at least one connected community pharmacy in every county in California.

Independent Pharmacies

There are 1,817 independent pharmacies in California, which are defined as pharmacies that operate in retail settings and are owned by a company with three or fewer pharmacies. Modoc, Lassen, and Mono Counties are among the counties with the highest percentage (90% -100%) of connected community pharmacies, but have the lowest percentage (50%-60%) of connected independent pharmacies (Figure 16). Since pharmacies are generally not incentivized to adopt e-prescribing processes, the lack of pharmacy adoption among independent pharmacies is likely due to the workflow changes and financial barriers associated with implementation. This could have potential implications on the ability for prescribers to send electronic prescriptions to these non-connected pharmacies.

Adoption gaps has been identified for counties with less than 70% connected independent pharmacies, which includes Modoc, Lassen, Siskiyou, Trinity, Tehama, Glenn, Napa, Solano, Sacramento, El Dorado, Amador, San Joaquin, Alpine, Mono, Merced, Madera, Santa Barbara and Kings counties.

[10] Rolston, L. The Economic Impact of Independent and Traditional Chain Pharmacies on the State of California. California Pharmacists Association. Aug 2008.

FIGURE 15: PERCENTAGE OF TOTAL E-PRESCRIBING PHARMACIES BY COUNTY IN CALIFORNIA

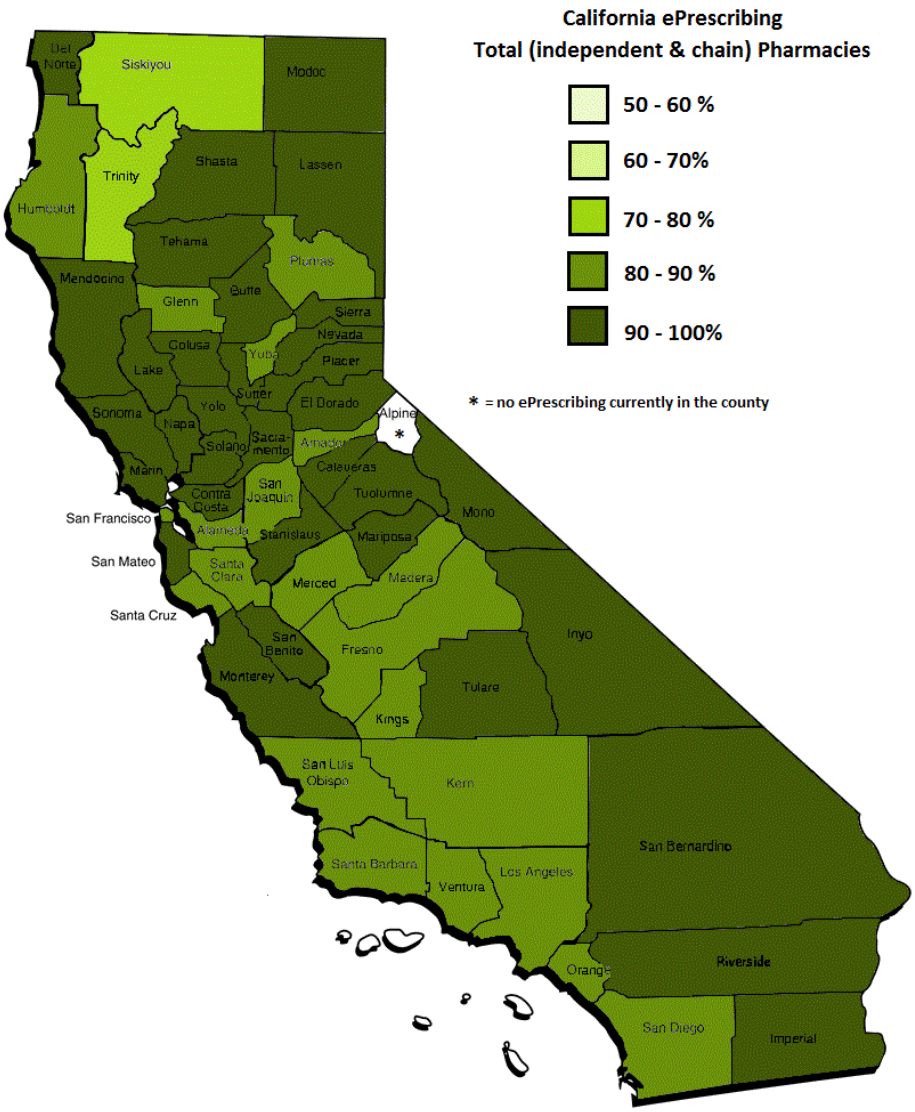
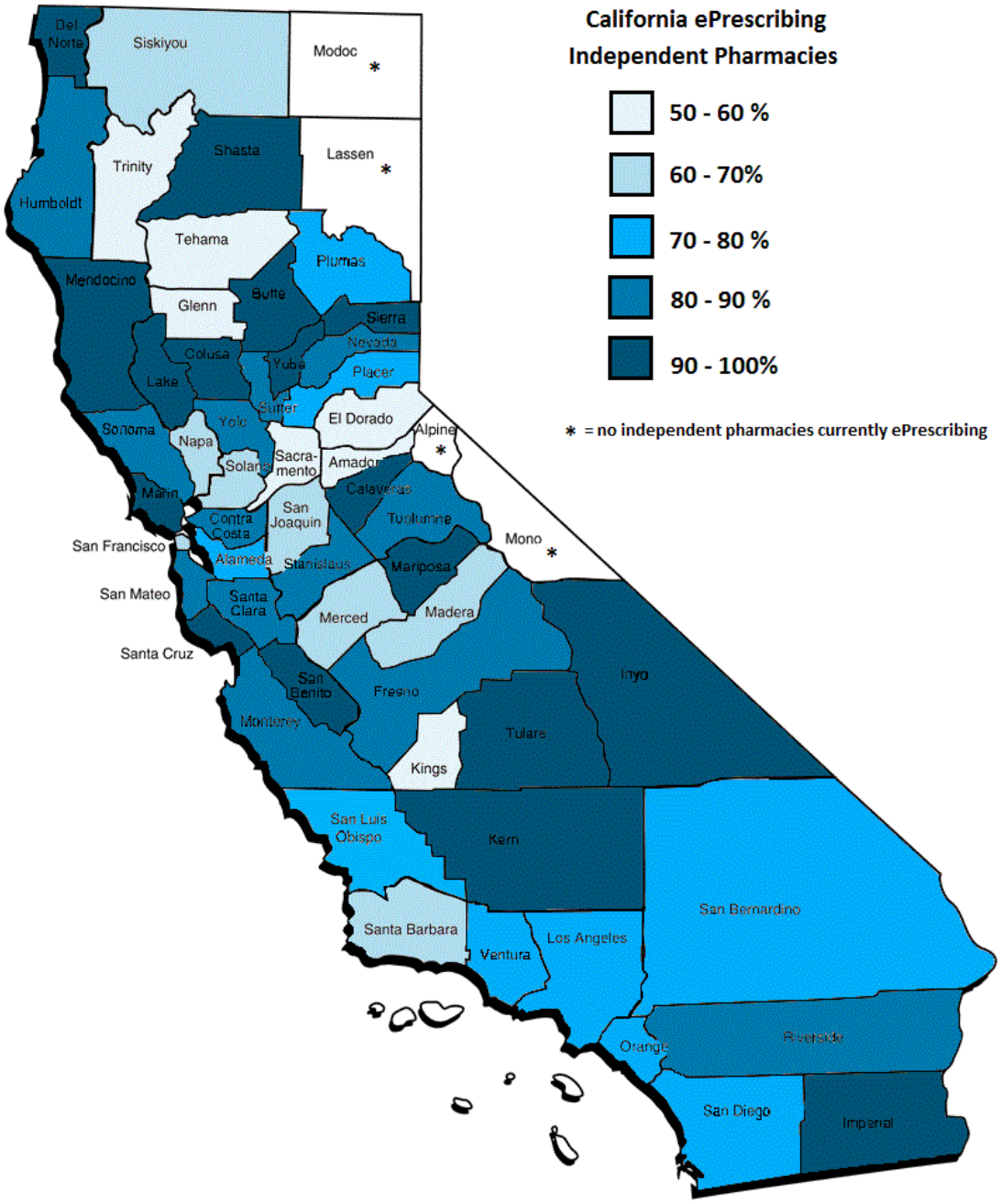


FIGURE 16: PERCENTAGE OF CONNECTED INDEPENDENT PHARMACIES BY COUNTY IN CALIFORNIA



E-prescribing Utilization

Physician adoption of e-prescribing does not guarantee that individual physicians will routinely use the technology, according to a national study from the Center for Studying Health System Change (HSC).[11]

Table 18 shows utilization statistics for physicians and pharmacies in California enabled through the Surescripts network. Unlike adoption statistics above, we were unable to obtain additional 2010 data from Kaiser Permanente or Veterans Affairs.

TABLE 18: E-PRESCRIBING UTILIZATION

METRICS	YE2007 Surescripts	YE2008 Surescripts	YE2009 Surescripts	YE2010 Surescripts
UTILIZATION				
% of Total eligible prescriptions Routed Electronically	1.44%	3.28%	9%	16%
% of Patient Visits with a Prescription Benefit Request	2.10%	2.93%	12%	18%
% of Patient Visits with a Medication History Response	0.50%	1.37%	1.72%	10%

*Data from Surescripts

Electronic Routing of Eligible Prescriptions Among Physicians

While the majority of community pharmacies are activated or connected for e-prescribing in California, only 16% of eligible prescriptions are routed electronically by 25% of physicians.

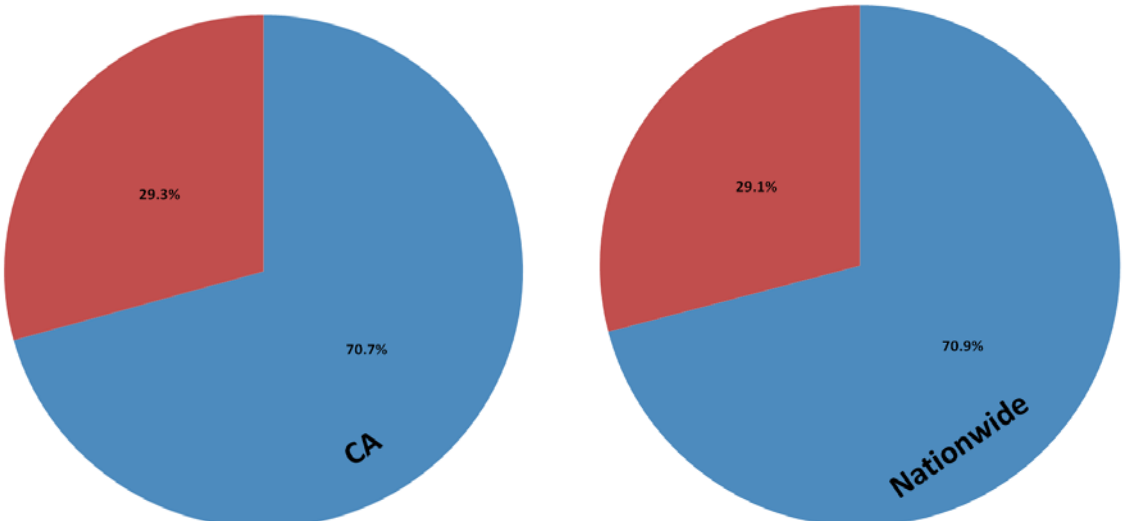
The electronic routing of eligible prescriptions does not include controlled substances, which were not eligible for e-prescribing under 2009 Drug Enforcement Administration (DEA) regulations. While year-to-year increases in the percentage of total eligible prescriptions routed electronically in California are high, these figures remain low and are below national percentages.

The overall percent of eligible prescriptions being routed electronically is lower in California than nationally. However, those who are e-prescribing are doing it

[11] Grossman, JM. *Even When Physicians Adopt E-Prescribing, Use Of Advanced Features Lag*. Issue Brief Cent Stud Health Syst Change. 2010 Jul;(133):1-5.

at a similar rate compared to national averages. In August 2011, 71% of e-prescribers in California sent more than 20 prescriptions that month, which is comparable to the national percentage (Figure 17.

FIGURE 17: E-PRESCRIBERS USING AN EHR BY VOLUME OF E-PRESCRIPTIONS

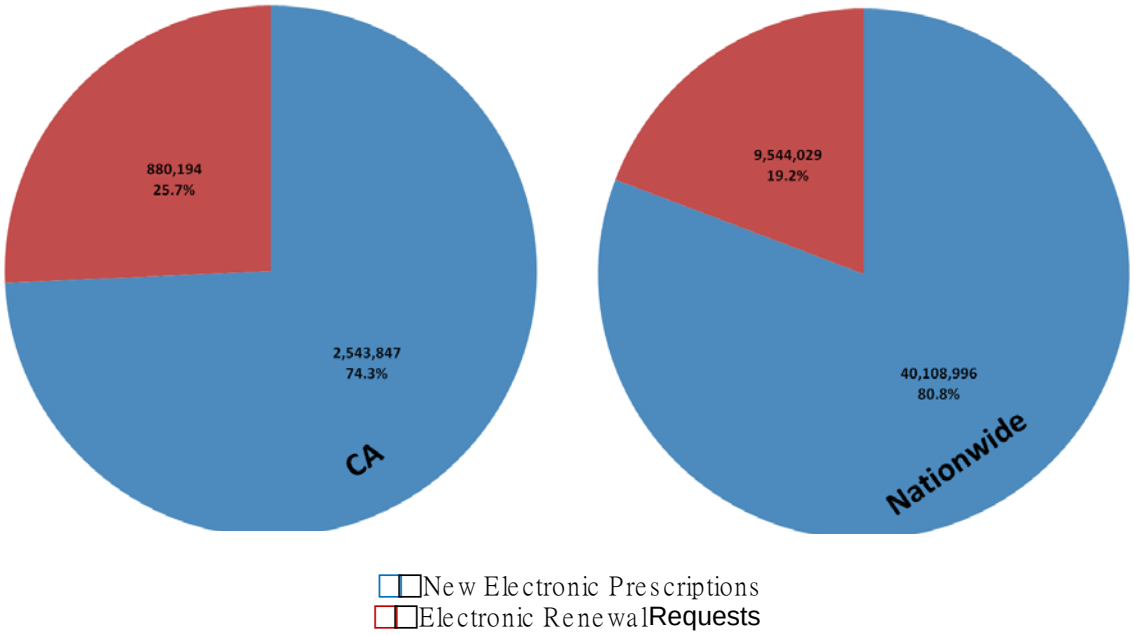


* Data from Surescripts

Electronic Routing of New Prescriptions vs. Renewal Requests

Over two million new prescriptions were routed electronically. This is compared to approximately 900,000 renewal requests in California, which was comparable to the national percentage. Several studies reveal that the electronic renewal process is a major challenge in e-prescribing. Unlike new prescriptions, renewal requests involve bidirectional communication between the prescriber and pharmacist. In order to complete the electronic renewal request process, the pharmacist must identify and locate the original prescriber and obtain the renewed prescription. Figure 18 shows the proportion of incoming orders that are new electronic prescriptions versus electronic renewal requests in August 2011.

FIGURE 18: NEW PRESCRIPTIONS AND RENEWAL REQUESTS



* Data from Surescripts

In the future, Agency plans on gather data on electronic renewal requests versus total prescription requests (electronic, phone, fax, etc.) or electronic renewal responses versus electronic renewal requests.

Benefit Information and Medication History Among Physicians

While most patients have prescription benefit information and medication histories available from their health plans, the utilization of this information at the point-of-care is low. Only 18% of patient visits to e-prescribers involved a prescription benefit request and only 10% involved a medication history response. This number increased to 18% in 2010 from 2.1% in 2007.

This data, which did not include Kaiser Permanente and Veterans Affairs, was low compared to the 30% of requests on a national level. The percentage of patient visits with medication history responses was even lower on an annual basis. Among the prescription benefit requests made, responses were even lower compared to the percentage of requests made. These low numbers may be attributed to the lack of availability of this information and knowledge among prescribers that the feature exists in their stand-alone e-prescribing system or EHR.

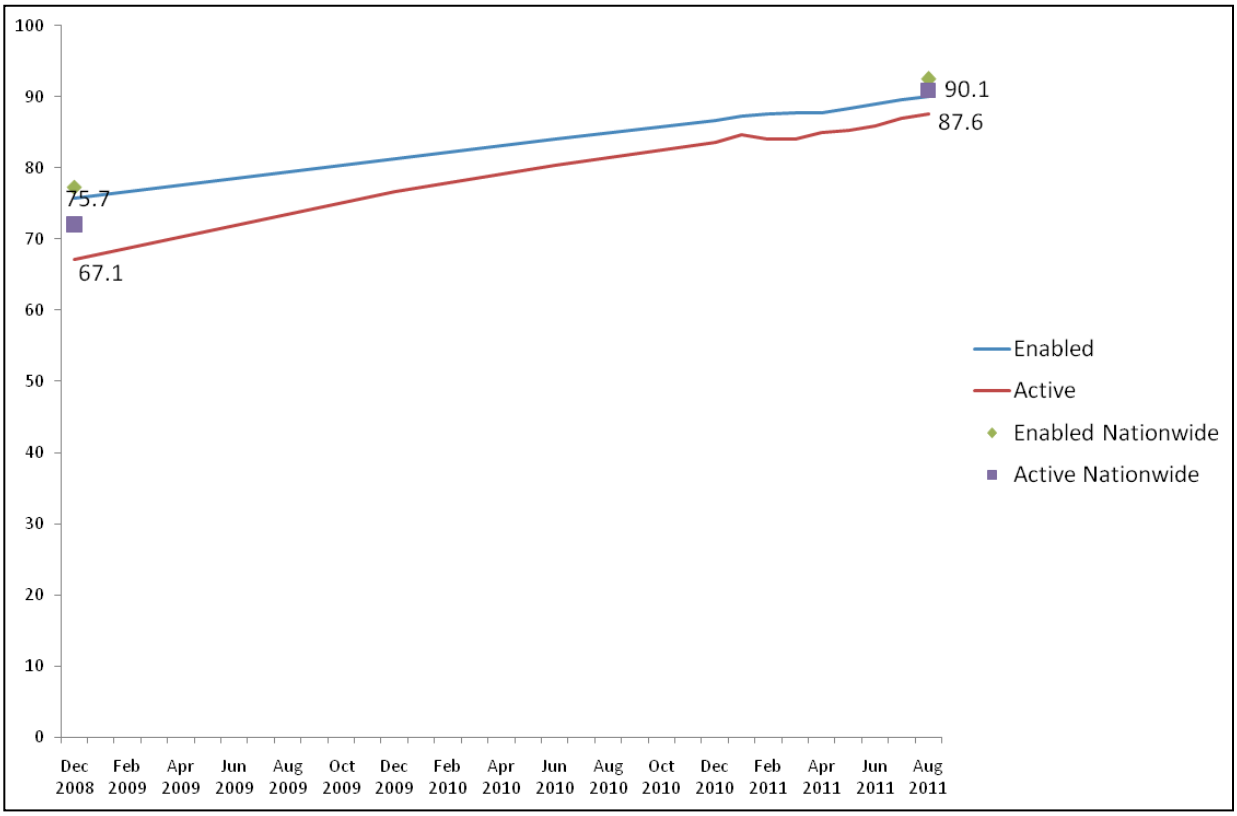
E-prescribing Utilization Among Community Pharmacies

Although the high percentage of e-prescribing enabled community pharmacies continues to increase on an annual basis, not all of them are actively e-

prescribing. The percentage of active community pharmacies, which means they receive electronic prescriptions, is below the national percentage of active pharmacies.

The percentage of community pharmacies connected increased from 75.7% in 2008 to 90.1% in 2011. These percentages were high and comparable to those at a national level (**Figure**). Although the percentages of active community pharmacies were consistently lower than those of connected community pharmacies, the gap is closing.

FIGURE 19: PERCENT OF COMMUNITY PHARMACIES ENABLED TO E-PRESCRIBE AND ACTIVELY E-PRESCRIBING ON THE SURESCRIPTS NETWORK



* Data from Surescripts

** Note: Denominator of pharmacies is provided to Surescripts by the National Council for Prescription Drug Programs and includes all pharmacies self-reporting a pharmacy class of "chain," "franchise," or "independent," and a dispenser type of "retail," "HMO pharmacy," "mail order," "clinic pharmacy," "specialty pharmacy," or "unknown."

Percentage of Covered Lives by County

What are the county level percentages of covered lives in California? Data from 2010 provided by Surescripts, Kaiser Permanente, and Veterans Affairs (Figure

20) reveals the counties with the highest and lowest percentages of lives covered.

FIGURE 20: COUNTY LEVEL POPULATION AND ADOPTION OF E-PRESCRIBING IN JUNE 2010

* Data from Surescripts, Kaiser Permanente, and Veterans Affairs

Sacramento, San Jose, Tulare, San Bernardino, and Riverside Counties were among those with high percentages (approx. 70% - 100%) of covered lives. Regions in northern California, including Del Norte, Modoc, and Humboldt Counties, had low percentages of covered lives, approximately less than 50%. It is important to note that the percentage of patients with benefit information may be low in counties with a low percentage of covered lives.

Forty-five out of fifty-eight counties in California have less than 70% of patients covered by a third-party payer. Therefore, a significant number of patients don't have prescription benefit information and medication histories available at the point-of-care.

Medi-Cal Providers and Pharmacies

It's been challenging to obtain e-prescribing data specific to Medi-Cal. Though the ONC has worked with Surescripts to obtain e-prescribing connectivity and

utilization data for California's providers and pharmacies, the data cannot be easily linked to Medi-Cal claims data. To correct this, OHIT and Agency have requested that the ONC work with Surescripts to provide an NPI field in the standard dataset to states in order to link the Surescripts data to Medi-Cal data. Several other states have made a similar request.

Some data does exist. By matching Surescripts subscribers against Medi-Cal provider files with an algorithm using name, address, phone number and other factors, DHCS has determined that in 2010 *approximately 9.3% of Medi-Cal providers were connected for e-prescribing.* This is somewhat lower than the 11.3% of all providers in California reported by Surescripts in 2009. (Surescripts data does not include Kaiser Permanente and the Veterans Administration, two large healthcare delivery systems that are fully electronic.)

Medi-Cal providers connected to Surescripts represent only 5% of Medi-Cal's prescription claims volume for 2010. At least two variables may affect the validity of this data: 1) the estimated accuracy rate of provider information is 80% at best relative to pharmacy claims; and 2) not all of the prescriptions from the providers will be sent electronically. Also, it should be noted that being Surescripts certified does not ensure actual use.

The following table shows e-prescribing utilization and the Medi-Cal patient to provider ratios in the state by region:

TABLE 19: E-PRESCRIBING UTILIZATION AND PATIENT/PROVIDER RATIOS

Region	Population	% of e-Prescribing Providers	Medi-Cal Population	% of e-Prescribing Medi-Cal Providers	Medi-Cal Patient: Provider Ratio
Northern Sierra[1]	485,836	24.5%	44,883	23%	50
Sacramento	1,422,789	43.2%	64,355	17%	18
San Francisco	810,078	8.1%	45,859	18%	63
Silicon Valley[2]	2,541,407	16.1%	59,616	13%	22
Central Valley[3]	1,281,545	13.3%	57,089	7%	56
Los Angeles	10,385,372	8.3%	502,716	7%	50
Inland Empire[4]	4,215,536	10.2%	142,568	6%	106
Orange	3,152,642	18.3%	52,340	10%	17
San Diego	3,138,382	21.8%	89,932	17%	24

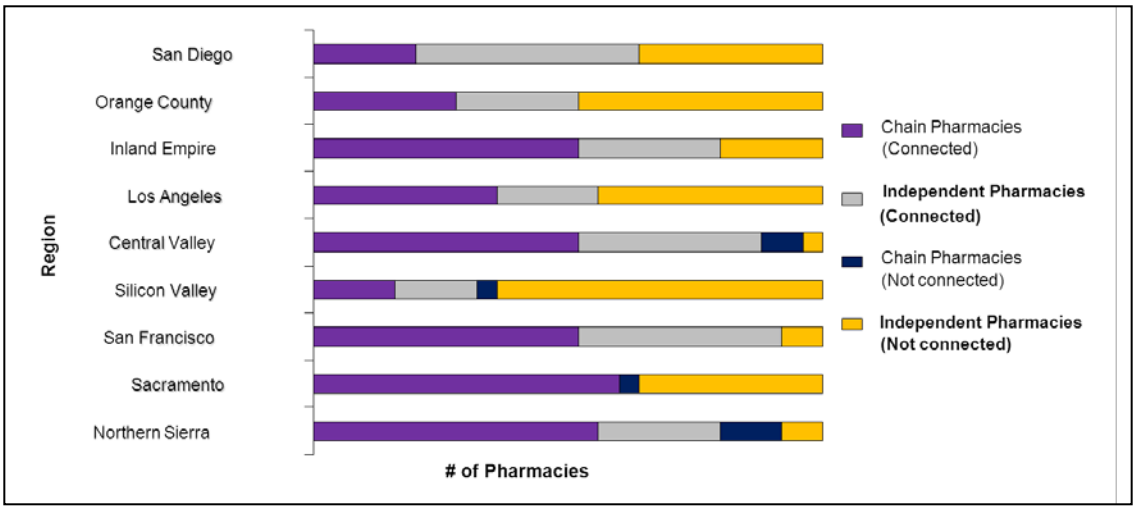
[1] Northern Sierra: Siskiyou, Modoc, Shasta, Trinity, Lassen, Tehama, Plumas, Sierra, Nevada Counties
[2] Silicon Valley: San Mateo and Santa Clara Counties
[3] Central Valley: Kern and Tulare Counties
[4] Inland Empire: Riverside and San Bernardino Counties

Currently, the Medi-Cal patient-to-provider ratio is very high in certain regions of California, mainly the Inland Empire, San Francisco County, the Central Valley, Los Angeles County, and the Northern Sierra. These counties make up 62% of the Medi-Cal population. With the exception of the Northern Sierra region, these areas also have the lowest percentage of e-prescribing providers in all of California.

In 2006, the L.A. Care Health Plan implemented a pilot project among Medi-Cal providers in Los Angeles County. With the project in place, over 60,000 prescriptions were sent electronically during the one-year trial period. Interestingly, *safety net providers had higher adoption and implementation rates than small or solo practice providers*. The current data indicates that activities to promote the adoption of e-prescribing in Los Angeles County should continue through the Medi-Cal EHR Incentive Program efforts.

Participating Medi-Cal Pharmacies and e-Prescribing Connectivity
Medi-Cal pharmacies, particularly independent pharmacies, have a low rate of connectivity (see Figure 21). The Silicon Valley has the fewest number of connected pharmacies overall, including the largest number of independent pharmacies that are not connected to receive e-prescriptions. Orange County and Los Angeles ranked right behind the Silicon Valley in terms of having the fewest number of connected pharmacies and the highest number of independent pharmacies not connected to receive e-prescriptions. A focus on getting these independent pharmacies connected will be vital for the successful transmission of e-prescriptions.

FIGURE 21: E-PRESCRIBING CONNECTIVITY OF MEDI-CAL PHARMACIES



*Above data represents the 25 highest Medi-Cal volume pharmacies in each of the nine regions

Roughly 50% of Medi-Cal's participating pharmacies are independents as opposed to chain pharmacies. While 97% of retail pharmacies affiliated with large chains are connected to Surescripts, only 62% of independent pharmacies are connected. The relatively low rate of connection of independent pharmacies to e-prescribing is an area of particular concern for DHCS because of the relatively high number of Medi-Cal beneficiaries served by these pharmacies. Understanding their needs will be a priority for DHCS.

1.8.4 ELECTRONIC LABORATORY REPORTING

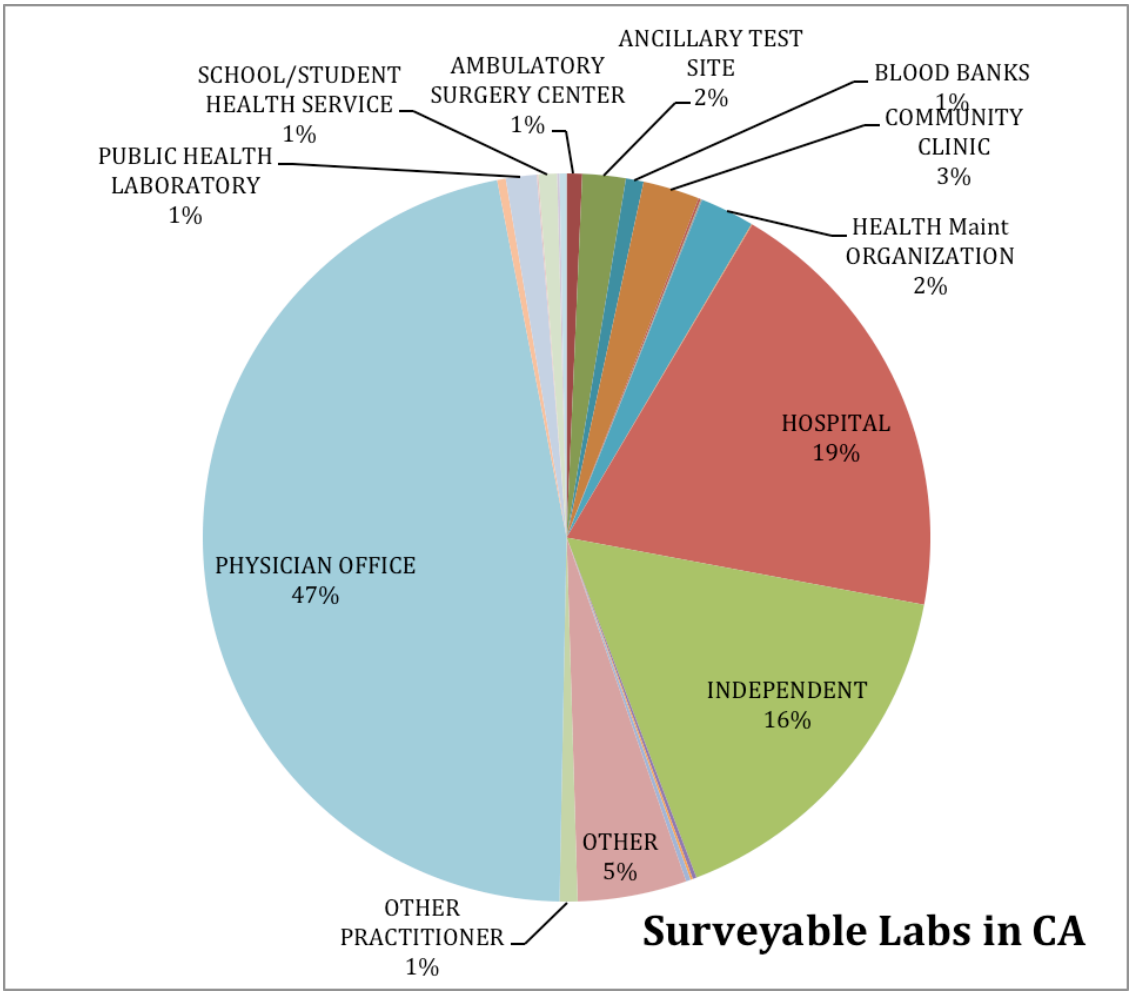
Under the Final Rule for the EHR Incentive Program, EHs and EPs will be required to incorporate more than 40% of lab test results into their EHRs as structured data. In addition, hospitals will be required to provide electronic submission of reportable lab results to public health agencies. These requirements represent some of the biggest challenges for ambulatory providers and hospitals to attaining meaningful use. In California there are 20,270 Clinical Laboratory Improvement Amendment (CLIA) certified labs. Labs are certified based on the volume and complexity of testing which is either waived, provider performed microscopy, moderate complexity, or high complexity. CLIA and State regulations require surveying only those labs that perform moderate to high complexity testing.

TABLE 20: CALIFORNIA CLINICAL LABORATORY IMPROVEMENT AMENDMENT (CLIA) CERTIFIED LABS

Lab Types by Category	Lab Types for Certification				Total
	Non-Surveyable		Surveyable		
	Wavier	Provider Performed Microscopy	Compliance	Accreditation	
AMBULANCE	73	1			**74**
AMBULATORY SURGERY CENTER	696	12	11	9	**728**
ANCILLARY TEST SITE	80	62	11	45	**198**
ASSISTED LIVING FACILITY	1				**1**
BLOOD BANKS	27			23	**50**
COMMUNITY CLINIC	440	313	16	57	**826**
COMPREHENSIVE OUTPATIENT REHAB	37	2			**39**
END STAGE RENAL DISEASE DIALYSIS	482			3	**485**
FEDERALLY QUALIFIED HEALTH CENTER	52	78	1		**131**
HELTH FAIR	28			1	**29**
HEALTH Maint ORGANIZATION	31	87	19	51	**188**
HOME HEALTH	1205	1	1		**1207**
HOSPICE	302	3			**305**
HOSPITAL	90	39	30	535	**694**
INDEPENDENT	44	12	333	139	**528**
INDUSTRIAL	11	2		5	**18**
INSURANCE	2				**2**
INTERMEDIATE CARE FACILITY	215		3		**218**
MOBILE LABS	74	7	3	3	**87**
OTHER	954	202	76	65	**1297**
OTHER PRACTITIONER	85	30	12	11	**138**
PHARMACY	303				**303**
PHYSICIAN OFFICE	7380	2537	984	372	**11273**
PRISON	10		10	1	**21**
PUBLIC HEALTH LABORATORY	4	1	39	1	**45**
RURAL HEALTH CARE CLINIC	83	46	2		**131**
SCHOOL/STUDENT HEALTH SERVICE	80	42	9	15	**146**
SKILLED NURSING/NURSING FACILITY	1106	14	2	1	**1123**
TISSUE BANK/REPOSITORIES	2	1	6	3	**12**
TOTAL	**13897**	**3492**	**1568**	**1340**	**20297**
	17389		**2908**		**20297**

The number of labs in California and the broad range of diversity (e.g. type, test volume, geography, technical capability, client base) present a great challenge to developing interfaces that enable the exchange of electronic laboratory orders and results between treating providers and fulfilling laboratories. To overcome this challenge and achieve Meaningful Use goals, identifying and prioritizing labs for a targeted focus for outreach will be critical to make substantial progress. Based on the certification type of 20,297 CLIA certified labs, there are 2,908 labs that perform the requisite volume and complexity of testing to be prioritized for further assessment and possible interventions. (See Table 20.)

FIGURE 22: PERCENTAGES OF SURVEYABLE LABORATORIES



As Figure 22 shows, more than 83% percent of these labs are physician office, hospital, or independent labs ("independent labs" includes Quest and LabCorp labs). Unlike laboratories that are part of larger organizations, many of these physician office laboratories are not prepared to send structured electronic laboratory data to outpatient physicians.

Many hospitals depend on income from hospital-based laboratories for support. Early studies by the California State Rural Health Association (CSRHA) indicate that this income may be particularly important for sustaining rural hospitals. Hospitals, particularly in rural areas, may be in need of assistance in establishing electronic connectivity for their laboratories to enable their community providers to attain meaningful use of EHRs. DHCS has identified the need to support hospital laboratories in quickly preparing for HL7-compliant transmission of results to be a priority for future funding requests.

California commissioned Sujansky and Associates to conduct an assessment of the issues related to ambulatory and public health lab reporting in 2010. The

results of this study found that labs currently have limited capacity to electronically report lab results to ordering providers and as mandated to public health agencies. It was recommended that the state establish:

1) A clear and comprehensive strategy for increasing access to structured lab results
2) Statewide standards that align ambulatory and public health reporting requirements
3) A process that will minimize the administrative burden of managing labs and that will encourage the use of structured and standardized electronic lab reporting tools
4) Policies, regulations, and operational processes that support electronic lab reporting

As a result of the work conducted by Sujansky and Associates on public health related lab challenges, Agency performed a laboratory landscape assessment that helps define the barriers that EPs and EHs will experience when incorporating lab test results into their EHRs. This assessment found that California laboratories are at varying stages of adoption of structured messaging infrastructure. The largest independent labs are well on their way to adoption. However, small and rural labs — whether independent, hospital, or physician office labs — face numerous challenges, including financial and technical capabilities.

The assessment also found that 40 sites out of 46 respondents (out of 151 contacted) are currently using some form of structured messages to exchange laboratory data. Organizations that implement structured message include Quest Diagnostics, Foundation Lab, Kaweah Delta Hospital, Ridgecrest Regional Hospital, UCSF Hospital, St. Joseph's Hospital, NHS Laboratory, Visalia Medical Clinic, etc.

Given limited resources to achieve the joint goals of 1) Having a high percentage of test orders and results exchanged electronically, and 2) Having a high percentage of organizations participating in lab data exchange, the report reiterated that a broad range of services, programs, incentives, and disincentives are necessary to meet segmented customer needs.

Agency is contributing resources from the State HIE Cooperative Agreement Program to support this collaborative effort with DHCS during the planning process, and anticipates providing additional support to the implementation of a statewide roadmap.

In late 2010, in collaboration with Medi-Cal, public health, labs and local HIEs, CeC convened a Laboratory Services Task Group to develop a strategy for adoption of standards and development of services to support electronic lab data exchange. Specific attention was given to:

- Working with the state to develop a roadmap for enabling lab exchange with Medi-Cal, public health and other state funded providers and entities
- Conducting a survey of messaging and transport standards which include the EHR-Lab Interoperability and Connectivity Specification (ELINCS) and Logical Observation Identifiers Names and Codes (LOINC) currently utilized among providers and labs
- Supporting labs and local HIOs in filling identified gaps
- Ensuring Agency grant program priorities include efforts that foster utilization and innovation in lab services

In June 2011, the Laboratory Services Task Group recommended promoting consistent messaging standards and specifications and determining a strategy to provide lab result routing services (push) among other potential services.

Following the recommendations of task group, Agency has been collaborating with Task Group members, RECs (regional extension centers), and the Standards and Interoperability (S&I) Framework to promote a nationally preferred messaging standard and specification for the California lab community.

Strategy

Between May 18, 2012 and June 14, 2012, CeC conducted a survey of 1,225 hospital and independent labs in California. Survey questions were based on instructions and questions provided by the ONC, which focus on laboratory operations and systems with respect to the electronic exchange of laboratory results. The goal is to collect data from these labs to facilitate outreach, build partnerships, and to set goals and track progress on – at minimum - the following program measures (Table 21):

TABLE 21: CALIFORNIA HOSPITAL AND INDEPENDENT LAB SURVEY RESPONSES

	Hospital Laboratories		Independent Laboratories		Total	
	Number	Percent	Number	Percent	Number	Percent
Laboratories Sending Results Electronically in Structured Format	63	34%	39	33%	102	34%
Laboratories Not Sending Results Electronically in Structured Format	115	62%	74	63%	189	62%
Laboratories Not Sure if Sending Results Electronically	8	4%	4	3%	12	4%
Total	186	100%	117	100%	303	100%
Laboratories Sending LOINC Messages greater than 0%	23	12%	15	13%	38	13%
Laboratories Not Sending LOINC Messages (=0%)	130	70%	85	73%	215	71%
Laboratories Do Not Know if Sending LOINC Messages	33	18%	17	15%	50	17%
Total	186	100%	117	100%	303	100%

A total of 303 (24%) labs completed the survey in which 61% were hospital labs and 39% were independent labs.

Hospital Laboratories

Among the hospital labs that responded, 34% reported sending electronic lab results to providers in a structured format, 62% reported not sending electronic lab results to providers in a structured format and 4% were unsure. When asked about LOINC messages, 12% of the hospital lab respondents reported sending LOINC messages, 70% reported not sending any LOINC messages and 18% did not know.

Independent Laboratories

Among the independent labs that responded, 33% reported sending electronic lab results to providers in a structured format, 63% reported not sending electronic lab results to providers in a structured format and 3% were unsure. When asked about LOINC messages, 13% of the hospital lab respondents reported sending LOINC messages, 73% reported not sending any LOINC messages and 15% did not know.

Agency is currently analyzing the results of responses to the remaining survey questions, which will be reported in the next Strategic and Operational Plan update.

1.8.5 PUBLIC HEALTH REPORTING AND SURVEILLANCE

LABORATORY AND DISEASE REPORTING

DHCS received P-APD administrative funding to support the work of the California Department of Public Health (CDPH) in partnership with the HIE Partner and other stakeholders in completing the development of an implementation guide that will support meaningful use submission of laboratory results from EHRs to public health. Because of budgetary issues, work on this began in March 2011. This implementation guide builds on assessments that began with other funding sources and will help align reporting standards and implementation specifications to minimize the work required of hospitals and public health departments across California and support Medi-Cal eligible providers (EPs) and eligible hospitals (EHs) in their achievement of meaningful use.

DHCS is partnering with CDPH to leverage existing state and local infrastructure that currently supports laboratory reporting in developing capacity that will support meaningful use requirements. Current systems and infrastructure, while having capacity to receive electronic data, were established prior to requirements to send and receive using HL7 standards as specified by ONC. Public health systems are conducting planning and system modification activities to adapt to these new federal standards for data transmission however there are significant resource gaps that limit the speed at which these activities can occur. A brief description of public health systems and their interfaces with meaningful use requirements are described below.

- The CDPH Center for Infectious Diseases Division of Communicable Disease Control has launched the **California Reportable Disease Information Exchange (CalREDIE).** CalREDIE is designed to improve the efficiency of surveillance activities and the early detection of public health events through the collection of more accurate and timely. Although the state focus on the ELR component has been on laboratory reporting to public health, CalREDIE will also be able to receive HL7 messages from EHRs in support of meaningful use. CalREDIE is being incrementally rolled out to provide real time disease surveillance capacity at the local and state public health levels in the following phases:
    - Local Health Departments: As of December 1, 2011 CalREDIE has brought 40 local public health departments into the system and is working to phase all LHDs interested in participating by 2013. (Note: Currently the counties of Los Angeles, Alameda, San Francisco, and San Diego have their own electronic disease surveillance systems, and have been resistant to transitioning to the use of

CalREDIE. During 2012, CDPH will be working to develop a plan for encouraging these jurisdictions to use CalREDIE or otherwise electronically transfer data between CalREDIE and their systems.) LHDs in all by 2013. LHDs are able to directly type enter all submitted confidential morbidity reports from providers and reportable disease reports from laboratories into web-based CalREDIE which allows LHDs to maintain one centralized location for disease reports. This initial entry by locals into CalREDIE will simultaneously serve both local and state disease reporting data requirements.

- Medical Providers: Providers have begun using an online web-based CalREDIE portal to type in details of mandated confidential morbidity reports [80 reportable diseases and conditions cited under Title 17 of the California Code of Regulations (Sections 2500, 2593, 2641.5-2643.20 and 2800-2812)] with the goal to have providers from all jurisdictions participating in CalREDIE with access during 2014, pending resources to support this work. In the future, the goal will be to have electronic confidential morbidity reports be sent automatically from the providers' EHR technology into the CalREDIE system.
- Laboratories: CalREDIE is in the initial stages of being capable of directly receiving the electronic submission of lab results for reportable diseases via the Electronic Lab Reporting (ELR) module. When fully implemented, the ELR component of CalREDIE will provide for electronic disease data submissions [over 60 reportable diseases under Title 17 CCR Section 2505], using HL7 standards, from approximately 2,200 commercial labs (hospitals, reference, public health, etc.) and 15,000 licensed physician-operated labs. State legislation (AB 2658) requires labs to electronically transmit lab reports to the State of California. Development and piloting of the ELR component is planned for 2011 and it is currently anticipated that this functionality will be fully functional in 2012.

- The Childhood Lead Poisoning Prevention Branch, through its web-based surveillance system **(RASSCLE II**), currently receives over 800,000 blood lead tests per year from over 250 laboratories via HL7 files. This program is participating in ongoing discussions with departmental programs regarding meaningful use and current electronic blood lead reporting from eligible providers and laboratories.

- **The Cancer Surveillance and Research Branch manages the California Cancer Registry**, which collects information about all cancers diagnosed in California) Statewide, population-based cancer reporting is required with the 1985 enactment of sections 103875, 103885, and 100330 of the California Health and Safety Code. The program uses laboratory reports as source data information when compiling complete cancer data abstracts. Currently, the California Cancer Registry has enrolled 82 pathology labs, which transmit directly to registry systems in an HL7 format. This program plans to expand electronic reporting of cancer pathology and to adapt the Public Health Lab Workgroup laboratory specification guidelines into their existing system.

In addition to receiving laboratory results, public health also receives specimens and generates results. Public health programs that provide results are described below. These programs will partner with DHCS and other eHealth stakeholders to leverage the CPOE meaningful use requirement.

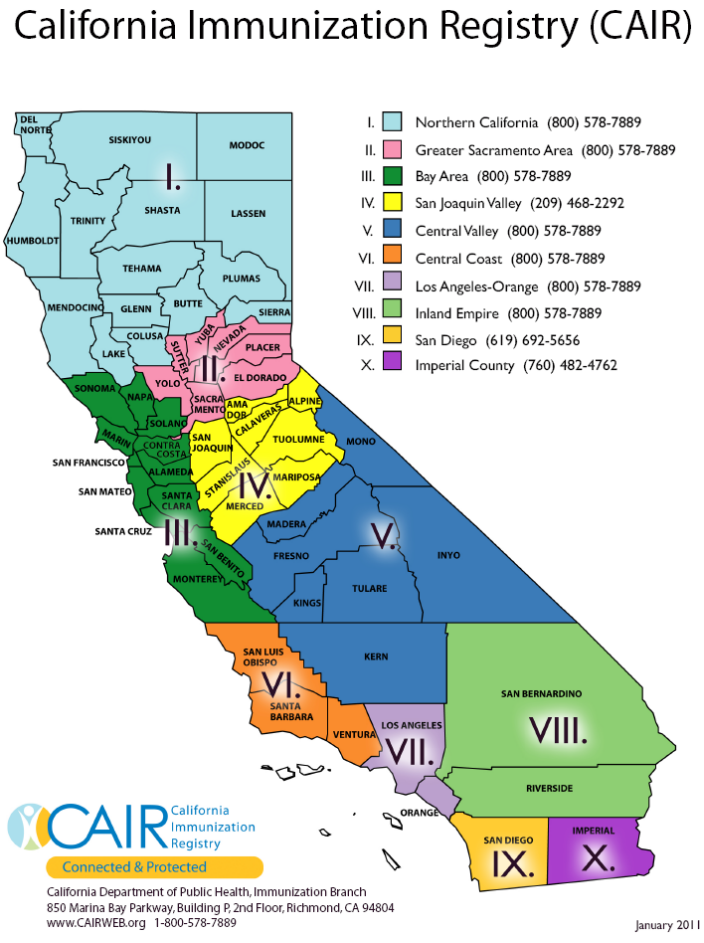
- The California Laboratory Information Management System (CalLIMS) implements a common data structure and user interface across the CDPH Center for Infectious Disease, Division of Communicable Disease Control, Microbial Diseases Laboratory (MDL) Branch and the Viral and Rickettsial Disease Laboratory (VRDL) Branch and other CDPH laboratories in order to centralize tracking of patient records and laboratory specimens. This system has the capacity to send HL7 messages to the CalREDIE system although there have not been resources to implement this functionality to date.
- The Genetic Disease Screening Program (GDSP) which includes the Prenatal Screening Program and Newborn Screening Program screens newborns and pregnant women for genetic and congenital disorders in a cost-effective and clinically effective manner. The screening programs provide testing, follow-up and early diagnosis of disorders to prevent adverse outcomes or minimize the clinical effects. The GDSP is working towards the electronic submission of screening results to hospitals and clinicians as well as the receipt of clinical provider order entries for newborn and prenatal screenings.
- The Lab Field Services (LFS) provides oversight for clinical and public health laboratory operations and for the licensed and certified scientists and other testing personnel who perform testing in clinical laboratories. To assist department-wide and statewide efforts to meet meaningful use requirements, LFS is working to disseminate information regarding these federal regulations to California laboratories and to collaborate with interagency efforts to administer lab assessments.

In addition to the above described activities at the state level, CDPH and DHCS are partnering with local public health labs to assess infrastructure needs to support meaningful use. Over the past several years there have been independent efforts led by the California Association of Public Health Laboratory Directors to assess and begin to address infrastructure needs necessary to exchange data with providers. This project, Cal-X, has been funded by Homeland Security, Cal EMA and other sources. Based on their assessments, most county labs do not have robust laboratory information management systems and many still use paper-based processes. Currently approximately a dozen local public health laboratories do have capacity to exchange laboratory results through Cal-X to providers in a collaborative, shared, secure, and cost-effective manner. Initial transaction sets supported by Cal-X include laboratory results (Title17), medical surge, mass evacuation/shelter, and catastrophic disaster situational awareness.

IMMUNIZATION REGISTRIES

Over the last 15 years, California has incrementally developed a collaborative, decentralized system of eight regional and two county web-based immunization registries collectively known as the California Immunization Registry (CAIR). See **Figure 23**.

CAIR provides secure, electronic exchange of immunization records to support the elimination of vaccine-preventable diseases. Within each region, CAIR allows users to see patient demographic data, immunization history, immunization forecasting, contraindications, overdue immunizations and other functions. CAIR provides users with copies of standard immunization record cards, usage reports, appointment reminders and inventory management. However, there is no capacity for the registries to exchange appropriate information (e.g. when a person moves from one



regional registry to another) or to search across multiple registries at this time, thus limiting these benefits to both providers and patients on a region-to-region basis and more generally, statewide. At the present time, there is no interoperability between CAIR and Public Health Surveillance reporting databases.

The majority of exchange between immunization registries and EHRs involves the transfer of updated immunization data, for which prompt, rather than immediate or real-time, exchange is usually sufficient. Approximately 150 organizations with at least 20 EHR systems have secure, current or pending data exchange with CAIR, primarily through data exports in a standardized flat file format. Seven of the ten registry systems utilize the same registry software, 'CAIR' software. This software is not HL7 compliant and therefore cannot accept data qualifying providers for meaningful use. However, the other regional registry software systems can exchange information via HL7. So for the purpose of reporting the immunization meaningful use measure, the hospital or provider would need to submit information to the immunization registry in their jurisdiction.

The state's strategy for notifying providers and hospitals of which public health measure to pursue has been to: 1) assess state and local health departments for readiness to accept, validate, test and store the immunization, syndromic surveillance or lab result data in the specified standard set by ONC; 2) develop a website for hospitals and providers to access and retrieve information on MU readiness in their jurisdictions (*http://www.cdph.ca.gov/data/informatics/Pages/eHealth.aspx*); 3) update the website with new standards, FAQs, other objectives and CQMs that have public health impact; and 4) provide informational updates in the statewide Stakeholder webinars and outreach presentations.

DHCS is supporting the development of statewide immunization registry capacity to receive HL7 messages in support of meaningful use through a previously approved P-APD-funded assessment. Due to the late passage of a state budget in October 2010 and the elimination of $18 million of state general funding for the entire Immunization Program in the budget, DHCS has requested a no-cost extension through the I-APD to conduct this project.

1.8.6 BROADBAND INTERNET ACCESS

In January 2008, the California Broadband Taskforce concluded that ubiquitous broadband services are "…an integral part of improving the overall health of Californians and driving down the cost of care." California has moved forward with this vision through a successful Federal Communications Commission (FCC) grant award of $22.1 million through the Rural Health Care Pilot Program - with the goal of significantly increasing access to acute, primary and

preventive health care in rural California. This funding is building the California Telehealth Network (CTN- *www.caltelehealth.org*) a high-speed broadband network that will allow for the expansion of an eHealth network with an emphasis on rural and underserved populations. This network will connect over 850 sites statewide. **It is expected that the network may expand to over 2,000 sites through other funding opportunities, such as those provided by the American Recovery and Reinvestment Act of 2009 (ARRA).** California's $3.6 million in matching funds is provided by California Emerging Technology Fund.

In addition to the CTN, California has another broadband network, the Corporation for Education Network Initiatives in California (CENIC), which provides broadband infrastructure to educational and research communities. Many of these facilities could be involved in the provision of clinical education programs.

In September 2010, the University of California, Davis and the CTN were awarded a $13.8 million Broadband Technology Opportunities Program (BTOP) Grant. This grant supports the adoption of broadband and technology enabled healthcare throughout the state by delivering multi-faceted training through partnerships with libraries, community colleges, health organizations and public safety sites. The project also intends to establish a best practice Model eHealth Community to demonstrate and facilitate the transition to technology enabled health delivery. It is funded by the federal government ($9.1 million) with a match of $4.7 million from California partners, namely the National Coalition for Health Integration, the California HealthCare Foundation and United HealthCare. This comprehensive training partnership is an innovative collaboration between academia, community-based educators, instructional design experts and tribal representatives. On-site and on-line courses will be developed or adapted to support the following curricula: Change Management, Broadband Adoption, CTN Broadband Orientation, EHR/HIE adoption, Telehealth Certificate Program, Consumer Health Informatics, and Clinician Health Informatics. Curricula will be leveraged for consumer education through public libraries, community colleges and local extension centers.

These networks are a product of California's longstanding commitment and investment in broadband and Telehealth. California is a national leader in the development of technology-supported health care, having passed the California Telemedicine Act in 1996. The California Legislature, Governor and voters have demonstrated their commitment to eHealth through the passage of bond funding, legislation and executive orders that support the continued expansion of broadband and eHealth applications.

California also has an HRSA designated Telehealth Resource Center (TRC) that provides program guides, best practices, technical assistance, and other supporting services to newly developing Telehealth programs funded by HRSA. The California Telemedicine and eHealth Center (CTEC) is one of only six

designated TRCs throughout the country. CTEC has developed a comprehensive set of written program development materials, video education and training, best practice guides, policy guides, Telehealth training programs and technical assistance.

TABLE 22: BROADBAND ACCESS FUNDING

Program	Federal Funding	CA Match	Total
FCC Rural Health Care Pilot Program	$22.1M	$3.6M	$25.7M
Broadband Technology Opportunities Program Grant	$9.1M	$4.7M	$13.8M
Total Broadband Funding			**$39.5M**

1.8.7 VULNERABLE POPULATIONS

Children in Foster Care in California

There are approximately 62,000 children in foster care in California. As is the case nationally, these children tend to have more complex health care needs than other children and account for a disproportionate share of Medi-Cal expenditures. Nearly half of all children living in foster care in California suffer from chronic illnesses, and children in foster care are three to six times more likely than those in the general population to have significant psychological or behavioral problems. Yet children in foster care receive less than optimal care for a number of structural reasons.

On average, children placed in foster care in California experience two to three changes in foster placements each year. Placement changes are often accompanied by changes in health providers. The existing system for sharing information about a child in foster care is, to a large extent, based on the passing of duplicate paper forms among caseworkers, public health nurses, foster parents, and health providers. Often providers do not receive forms, or receive forms that are missing crucial information about the child. Inadequate medical records for children in foster care contribute to poor quality health care that, in some instances, can be life-threatening. This can include duplication of immunizations, over-prescription of psychotropic medications, misdiagnoses, and subsequent medical errors and omissions based on faulty paperwork. According to Children's Action Network, "doctors often have no reliable birth or immunization records, don't know who has previously treated the child, and have no facts about current and past diagnoses, treatments, or prescriptions."

Electronic exchange of key information for this highly mobile, high-needs population of children can result in greater coordination of care between

providers and caretakers. This can increase efficiency, reduce program costs at the state and local levels and significantly improve outcomes for youth in foster care. Early findings from related efforts indicate that the information management and coordination of care enabled by a system of electronic information-sharing can result in improved preventive care, decreased hospital stays, improved clinical conditions, and decreased cost of care. After implementation of electronic information exchange in Milwaukee, Wisconsin, the number of youth in residential programs declined from 364 to 140 per day, psychiatric hospitalizations declined by 80%, and the cost of care per child dropped from $5,000 per month to less than $3,300. Children in foster care also experienced a variety of improvements in clinical conditions.

Agency recognizes the great potential to improve coordination across the many programs and services available to children in foster care through the use of EHRs and electronic data-sharing and has been working with stakeholders to develop interventions and pilot projects. The long-term goal is provide access to information to foster parents, caseworkers, health providers (physical, mental, and dental), public health nurses, educators, attorneys, judges, and older youth in foster care. The California information technology architecture involved may include the statewide health information exchange (HIE) infrastructure, the Medicaid Management Information System (MMIS), and the State Automated Child Welfare Information System (SACWIS), as well as local systems that vary by county. The goals of this long-term effort is to provide comprehensive information about a child, facilitate communication among providers so they can more effectively coordinate and deliver care to children, afford foster parents and older youth in foster care access to information, and provide youth in foster care with a record of conditions and services received.

1.9 Strategy to Meet Meaningful Use

California is committed to helping eligible provides meet the HIE requirements of Meaningful Use. The PIN 001 identifies three immediate priorities for state HIE programs to ensure that these providers have at least one option available. They include:

- e-prescribing
- receipt of structured lab results
- sharing patient care summaries across unaffiliated organizations.

In addition, ONC has added the support of public health criteria and reporting of clinical quality metrics as priorities. All five priorities are represented in the Final Rule for Stage 1 Meaningful Use criteria.

These criteria will be supported through a number of activities that broadly fit within five major categories:

1) Establishing Consensus Exchange Specifications. These will support all of the Meaningful Use criteria by adopting standards to fill gaps in those specified in the Final Rule for Stage 1 and in the EHR certification criteria, as well as working with EHR vendors to ease integration with HIE.

2) Grant-making to support HIE. Grants and financial support to HIOs, providers, and others to enable achievement of prioritized Meaningful Use exchange objectives. These are described at the end of this section.

3) Providing Technical Assistance. This will enable independent pharmacies to receive electronic prescriptions, local labs to provide structured electronic lab results, and health departments and registries to receive electronic updates, as well as review usability and provide education for e-prescribing users.

4) Developing Statewide Services. Targeted at providing options for providers where insufficient HIO- or commercially-supported solutions exist, these will enable standards-based electronic exchange with federal and state agencies.

5) Conducting Demonstrations and Pilots. These will explore and demonstrate the utility of emerging approaches to health information exchange, as well as test specifications to ensure they meet the intended needs.

Agency will support Meaningful Use and Health Information Exchange by implementing projects and programs to move the following priorities in 2012:

1.9.1 ELECTRONIC PRESCRIBING (E-PRESCRIBING)

E-prescribing rates have been steadily climbing in California, fostered by its potential to increase efficiency and quality as well as by adoption incentives provided in the Medicare Improvements for Patients and Providers Act (MIPPA). However, barriers still remain to full adoption. **Many providers require technical assistance and support to reach Meaningful Use, with e-prescribing a top priority.** In order to overcome the adoption and utilization challenges that providers face, all aspects of the e-prescribing process involving health plans and pharmacies need to be addressed. Based on stakeholder priorities, Agency has developed strategies to increase the adoption and Meaningful Use of e-prescribing in California.

1.9.1.1 PARTNERS IN E: PROMOTING SAFER USE OF ELECTRONIC HEALTH RECORDS FOR BETTER CARE

Partners in E is an innovative program of curricular development and outreach that aims to better integrate the discipline of safety science into a health information technology (health IT)–enabled world. This program is modeled after two successful teaching programs developed by the UCSF Department of Clinical Pharmacy on both state and national levels: a Medicare Part D training program, *Partners in D* (http://www.partnersind.com) and a comprehensive tobacco cessation training program, *Rx for Change: Clinician-Assisted Tobacco Cessation* (http://rxforchange.ucsf.edu). These programs have proven results and extensive literature supporting their success. Further, these programs are sustainable with the training programs continuing well beyond the duration of funding. *Partners in E* will use a similar process for evaluation, education and outreach, with a focus on the following objectives:

1. Create a cross-disciplinary learning environment for health IT among health professionals that is focused on shared learning, maximizing transparency and minimizes the burden of Electronic Health Record (EHR) adoption to providers.
2. Educate and deploy a pharmacy student workforce with the attitudes, knowledge, and skills required to identify and resolve barriers to e-prescribing in community pharmacies, a critical component of health IT adoption in California.
3. Evaluate the current state of health IT on patient safety and identify strategies to minimize the risk of its implementation and use.

The second goal of the *Partners in E* program is to educate and deploy a pharmacy student workforce with the attitudes, knowledge, and skills required to identify and resolve barriers to e-prescribing in community pharmacies. This is a critical component of health IT adoption in California. To expedite rapid adoption of e-prescribing, the *Partners in E* program also will establish two Pharmacy Regional Extension Centers (Rx-RECs) to provide technical support for community pharmacies in the northern and southern regions of California. Further, the *Partners in E* program will use an established train-the-trainer program model to disseminate the health IT curriculum that can be taught in a standardized and consistent format across schools of pharmacy in California. See the timeline for this project in Table 23. You can read more about Partners in E and how it relates to HIE sustainability in Section 3 of this document.

TABLE 23. PARTNERS IN E PROJECT TIMELINE

	Estimated Start Date	Estimated Finish Date
Develop partnerships and complete subcontracts with UC Extension	6/29/2012	9/30/2012
Develop the curriculum materials for the *Health Information Technology for Pharmacists* course at UCSF	6/29/2012	12/31/2012
Develop evaluation plan, including creating and piloting evaluation tools	6/29/2012	12/31/2012
Establish community pharmacy partnerships within the Silicon Valley region	6/29/2012	12/31/2012
Develop *Partners in E* internal website	6/29/2012	12/31/2012
Pilot the *Health Information Technology for Pharmacists* course at UCSF	1/1/2013	5/31/2013
Develop training materials and update community pharmacy outreach toolkit for the *Health Information Technology for Pharmacists* course	1/1/2013	7/31/2013
Hire staff; set up infrastructure for Southern California Rx-REC	1/1/2013	12/31/2013
Establish statewide community pharmacy partnerships	1/1/2013	12/31/2013
Continue to update and revise the *Health Information Technology for Pharmacists* course materials, including the community pharmacy outreach toolkit, as needed	1/1/2013	12/31/2013
Evaluate pharmacy staff experiences with student outreach at community pharmacies	1/1/2013	12/31/2013
Conduct training sessions to other schools of pharmacy in California for the *Health Information Technology for Pharmacists* course	8/1/2013	12/31/2013
Students from other schools of pharmacy in California initiate the *Health Information Technology for Pharmacists* course	9/1/2013	12/31/2013
Students from other schools of pharmacy conduct community pharmacy outreach	10/1/2013	12/31/2013
Present Partners in E results at state and national meetings	10/1/2013	12/31/2013

Partners in E Budget (Goal 2): $2 M
Funding for Goals 1 & 3—pending CMS I-APD approval

1.9.1.2 PHARMACY GRANT PROGRAM

E-prescribing utilization is low among independent pharmacies, limiting successful e-prescribing between prescribers and pharmacies. The California Pharmacy Grant Program will be modeled after a Tennessee program that targets independent pharmacies in California that are not currently participating in e-prescribing. The overall goal is to engage these pharmacies in discussions about the benefits of e-prescribing and to increase the number of independent pharmacies enabled in e-prescribing.

According to 2010 Surescripts data, 81% of community pharmacies were enabled for e-prescribing while only 62% of independent pharmacies are enabled in California. The Grant Program will focus on getting independent pharmacies enabled for e-prescribing.

Pharmacy Grant Program Timeline:

- Development and implementation of pharmacy survey to include the top 100 independent pharmacies by Medi-Cal claims volume will take place during Q2 2012
- Survey results to inform Pharmacy Grant Program criteria, funding amounts and to guide Partners in E curriculum development for technical assistance in Q3 2012.
- Coordination with stakeholders (RECs, pharmacy associations, Partners in E Program, etc.) will take place in Q3 2012 to promote program and provide outreach to potential, participating independent pharmacies
- Accept applications in Q3 2012
- Award and announce grantees in Q4 2012
    - Award amounts: Up to $5,000 per pharmacy (target 107 pharmacies)
- Track and monitor until Q4 2015
    - Must install/upgrade e-prescribing software within 60 days from the date of award
    - Must demonstrate e-prescribing every month for 3 years
- Seek future funding for sustainability
    - Request for 90/10 support in future phase(s)of programs

Pharmacy Grant Program Budget: $500,000

1.9.1.3 E-PRESCRIBING OF CONTROLLED SUBSTANCES INITIATIVE

In June 2010, the Drug Enforcement Administration (DEA) passed regulations to allow the e-prescribing of controlled substances (EPCS). Although e-prescribing software developers have been moving their systems towards these requirements, it is not anticipated that any software systems will be ready and certified at wide scale in the near future. In addition, some state laws and regulations will require changes before controlled substance e-prescribing will be fully legal. The current issue is confusion among prescribers and pharmacists that EPCS shall not be allowed until DEA requirements are met. A number of physicians and physician office managers have insisted that the e-prescribing of controlled substances is currently allowable in their practice without an EPCS certified system, which is incorrect.

Computer software vendors will incur certification costs associated with initial EPCS audits. It is possible that some of those vendors might try to pass such costs along to their users. There is a lack of incentive for small providers and pharmacies to participate in EPCS due to these additional costs to e-prescribe.

This initiative has three components to address these barriers:

1. Accelerate vendor incorporation of EPCS into their systems by collaborating with RECs to inform the EHR preferred vendor lists.
    a. Providers who sign up for REC membership are offered an EHR vendor selection process to help them assess their needs and choose which vendor is the best fit for their practice.
2. Education to reduce the confusion and lack of education around EPCS.
3. Grant opportunities to support EPCS enhancements among independent pharmacies.

<u>e-Prescribing of Controlled Substances Initiative Timeline:</u>

- An issue brief/newsletter distributed to 100% members of RECs, CA Medical Association and CA Pharmacists Association by Q3 2012
- Formal recommendation of EPCS enabled EHR/stand-alone systems to RECs for their preferred vendor list by Q3 2012
- Grants provided to 50 independent pharmacies for EPCS enhancements by Q3 2013

e-Prescribing of Controlled Substances Initiative Budget: The budget isn't known currently; it will be determined after the transition from CeC to Future Partner.

1.9.1.4 E-PRESCRIBING STANDARDS AND DIRECTORY SERVICES INITIATIVE

The E-Prescribing Standards Initiative is focused on encouraging the efficient use of new local Directory Services to support e-prescribing use and the entry-level and optional components of SCRIPT Version 10.6. Pilot studies will be implemented to help identify the source of specific e-prescribing issues before broad implementation of local Directory Services and the NCPDP standard. Individual prescribers and pharmacies should be able to apply and evaluate the enhancements by processing new prescriptions, renewal requests and/or renewal response messages, with appropriate coordination and involvement of POC and pharmacy vendors. Providing education through best practices will be developed to help accelerate the adoption and use of the supplemental directory and/or standard. This effort will require the involvement of prescribers, pharmacies, POC and pharmacy vendors to improve transparency on the benefits and barriers associated with the use of these enhancements.

<u>e-Prescribing Standards Initiative Timeline:</u>

- Identify a pilot site and develop an implantation plan to supplement the current Surescripts directory with Directory Services maintained at the local level in Q3 2012
- Implement the pilot project for Directory Services to support ePrescribing in Q1 2013

- Identify key safety and efficiency issues through testing of existing message types and key enhancements of SCRIPT 10.6 by the end of 2012
- Provide recommendations to resolve key safety and efficiency through testing by Q1 2013

e-Prescribing Standards Initiative Budget: TBD

1.9.1.5 MINIMUM OUTCOMES REPORTING FOR HEALTH PLANS PROJECT

Technical standards for e-prescribing systems have been adopted to support the availability of information for clinical decision support (CDS) such as pharmacy eligibility, benefit, formulary and medication history information and internal decision support within the e-prescribing software that includes drug utilization reviews.

However, little is known about how prescribers use the information communicated by these standards in prescribing practice. In fact, previous studies have found that variation in the implementation of EHRs and unrealistic expectations about the capabilities of these systems before implementation contributes to suboptimal usage.

The first phase of this project is focused on the availability of information for clinical decision support (CDS) and measures the value, safety and costs from

a health plan perspective. A common set of minimum data requirements will then be developed and broadly communicated to health plans, PBMs, e-prescribing networks, vendors and prescribers who will work with those stakeholder groups to achieve routine availability of CDS information. Implementation of this project is anticipated for Q3 2012. If the opportunity is available, future phases will focus on standardizing reporting elements for other e-prescribing stakeholders.

Minimum Outcomes Reporting for Health Plans Project Timeline:

- Ensure the e-prescribing Activity Reporting requirements include 100% of the data elements identified in the minimum core data set by the end of Q2 2013
- Increase the availability of CDS information from Surescripts and/or PBMs by the end of Q3 2013

Minimum Outcomes Reporting for Health Plans Project Budget: TBD

1.9.1.6 E-PRESCRIBING USABILITY REVIEW

E-prescribing is in its early stages of adoption and utilization by physicians within the larger context of general EHR adoption. According to November 2011 Surescripts data, 27% of office-based physicians in California sent an electronic prescription on the Surescripts network using an EHR. Nationwide, 37.6% of office-based physicians e-prescribed through an EHR on the Surescripts network.

E-prescribing, a component of computerized physician order entry (CPOE), has shown reductions in incomplete and inappropriate prescriptions, in adverse drug events, improvements in antibiotic ordering patterns, and decreases in length of stays and costs. However, evidence points at reluctance of physicians to use CPOE systems, and to some degree e-prescribing, due to increasing time for ordering, decreasing interaction with patients and nurses, and lack of integration with workflow, reducing the ultimate success of CPOE and e-prescribing.

This intervention is designed to address the examination and evaluation of e-prescribing usability among four major EHR/stand-alone system vendors. Improving e-prescribing usability can increase both adoption and utilization among prescribers who interact with e-prescribing applications within EHR, stand-alone systems and pharmacies that receive the resulting messages and artifacts of these interactions. Patients are the ultimate beneficiaries of an efficient, safe e-prescribing process.

e-Prescribing Usability Review Timeline:

- •80% of physicians through the Medical Board will be provided e-prescribing Usability Guidelines to help them select an EHR or stand-alone system vendor by Q4 2013
- •100% of eligible professionals through the RECs will be provided the e-prescribing Usability Guidelines to help them select an EHR or stand-alone system vendor by Q4 2013
- •100% (four EHR/stand-alone system vendors) of participating EHR/stand-alone system vendors will receive the e-prescribing Usability Guidelines by Q4 2013

e-Prescribing Usability Review Budget: TBD

1.9.1.7 USER GROUP INITIATIVE

Prescribers and pharmacies are faced with the challenge of providing quality care while dealing with the continuing evolution of standards, vendor-specific capabilities, and competencies that impact e-prescribing data transmission and workflow processes. Prescribers and pharmacies implementing e-prescribing technology require significant technical assistance and may be underusing the existing issue resolution processes available from their vendor technical support and network support services. This is likely due to lack of familiarity with these processes or frustration with their ineffectiveness. Therefore, it would be beneficial for these e-prescribing users to unite to share experiences and challenges.

This initiative focuses on identifying existing e-prescribing user groups and effectively communicating to the stakeholder community on how to access these groups.

User Group Initiative Timeline

- 10% of total members who received outreach (RECs, CMA and CPhA) visit the website and 5% provide ratings by the end of 60-day trial period
- 40% of total members who received outreach (RECs, CMA and CPhA) visit the website and 20% provide ratings by the end of Q2 2013

User Group Initiative Budget: TBD

1.9.2 STRUCTURED LAB RESULTS EXCHANGE

The strategy for enabling labs to exchange structured lab results, including state and county labs, continues to focus on the integration capability of existing, developing, and expanding HIOs. **Many existing national and local labs currently deliver structured lab results via HIO integration using recognized HL7 messaging standards.** However, many local independent or hospital labs do not have the IT resources to enable electronic reporting.

Agency will enable local lab reporting through a two-pronged approach:

- Lowering the cost of integration of EHRs, labs, and existing and emerging HIOs by promoting a constrained set of consensus standards for EHR receipt of structured lab results.
- Providing technical assistance for independent and hospital labs in developing the capability for electronic reporting of lab results.

Promoted standards will align with, and therefore leverage, national standards and proposed standards for Stage 2 Meaningful Use EHR certification criteria. Technical assistance will fill the gap between lab capabilities and provider needs – a gap not addressed directly by the EHR incentive program or the Meaningful Use criteria to incorporate structured lab results into certified EHRs.

Specifically, Agency will:

1) Establish and promote uniform consensus standards for lab results exchange.
2) Begin a technical assistance program to enable local labs to develop the capability to provide results electronically and integrate with existing and emerging HIE activities.

Table 24 lists milestones for implementing the strategy to structured lab results exchange.

TABLE 24. STRUCTURED LAB RESULTS EXCHANGE TIMELINE

Milestone	Completed
Establish a consensus implementation guide for exchange of electronic lab results between labs and EHRs.	Q2 2012
Demonstrate lab results exchange using consensus standards at California Connects, a vendor and HIO exhibition of standardized exchange in California.	Q3 2012
Establish tools for lab results exchange and a technical assistance program for independent and hospital labs.	Q3 2012
Initiate an interface grants program for HIOs to integrate independent and hospital labs.	Q3 2012
Initiate a technical assistance program for independent and hospital labs.	Q3 2012
Enable exchange of electronic lab results for at least 200 additional independent and hospital labs.	Q2 2013

Structured Lab Result Exchange Budget: $355,215

1.9.3 CARE SUMMARY EXCHANGE

Providers in California exist within a varied landscape of business requirements and capabilities for health information exchange. **The California strategy for care summary exchange acknowledges the varied landscape we find within the State, and is designed to work with the varied needs rather than deliver a single, one-size-fits-all solution.** That strategy has three primary components:

1) Support a rich exchange environment, including exchange of care summaries, for providers within HIOs.

2) Encourage exchange of care summaries between unaffiliated providers across HIOs or other service providers using NwHIN Exchange and NwHIN Direct specifications.

3) Develop a lightweight option for providers that do not have access to an HIO or do not wish to join one.

Each of these components are described in more detail in the following sections, followed by an integrated timeline and list of milestones for operationalizing the strategy.

1.9.3.1 CARE SUMMARY EXCHANGE WITHIN AN HIO

For many providers and provider organizations, becoming a participant in an HIO is an acknowledgement that they share a common set of business needs, privacy requirements, and preferred workflows that are served by the technologies and functions provided by the HIO. That is true whether the HIO is a regional, public, not-for-profit organization created to govern exchange for a diverse collection of stakeholders, a service provider enabling exchange through technical services to its individual participants, or a large, closed health organization creating enterprise HIE services to connect its constituents and their systems.

The fact that HIOs exist with differing features and workflows illustrates regional variation and the aggregation of providers with common needs. These existing HIOs already provide a rich set of exchange capabilities that have been adopted by their users and integrated into their daily activities. In some cases, the primary service is the efficient delivery of health information: electronic lab results, referral or discharge notes, prescriptions, etc.

In many cases, the services include a repository of health information that can be accessed to retrieve information, often implemented as a federation of repositories linked by a record locator and data aggregator. In most cases, the services include the exchange of care summaries on demand, perhaps as part of an integrated longitudinal community record as well as a standardized CCD.

California's HIE strategy should not interrupt ongoing exchange of care summaries within public or enterprise HIOs by imposing any specific technology or approach. Instead, we encourage HIOs to develop the capabilities to exchange care summaries that are in line with the business needs and workflow requirements of their constituent members – their customers – and support these efforts through expansion and infrastructure grants. Where possible and desired by eligible providers and hospitals, the input and output for these services are the CCD documents required for certified EHRs to meet meaningful use requirements.

To support intra-HIO exchange of care summaries, California will:

1) Support care summary exchange within public and enterprise HIOs via grants to establish new and expanded services in line with PIN 001 and PIN 002 priorities.

2) Enable the continued use of existing query-based retrieval of care summary information, but encourage CCD exchange as required by meaningful use and the new transitions-of-care specification through

participation in state and national demonstrations, market pressure on vendors, and requirements in our grant program.

1.9.3.2 CARE SUMMARY EXCHANGE WITH UNAFFILIATED PROVIDERS

While California supports the exchange of health information among affiliated providers within a public or enterprise HIO, the exchange of care summaries among unaffiliated providers present the larger challenge requiring statewide — and nationwide — coordination.

1.9.3.3 USE OF NATIONWIDE HEALTH INFORMATION NETWORK SPECIFICATIONS

An analysis of business requirements and provider needs suggests that query/response based exchange, while presenting a greater technical barrier to entry, is an equally important requirement for sustainable health information exchange. Providers have identified business requirements that include the need to exchange care summaries using both directed exchange and the query/response model.

Therefore, California promotes exchange of care summaries through query/response exchange as well as directed exchange in order to meet provider business requirements and provide a sustainable model for health information exchange.

The work of the Direct Project has provided a simple yet effective technical mechanism for directed exchange, with a set of specifications and a reference implementation that can be utilized by HIOs or service providers. Likewise, the Nationwide Health Information Network (NwHIN) has created a robust set of specifications for patient discovery and query/response document retrieval that has been implemented in CONNECT.

To leverage market pressures created by Meaningful Use and other federal programs, and to take advantage of the Direct Project and CONNECT initiatives, we have elected to use NwHIN Direct specifications for directed exchange and NwHIN Exchange specifications for patient discovery and query/response exchange between HIOs and service providers. California is encouraging HIOs to adopt one or both of these mechanisms to facilitate inter-HIO exchange, making it a requirement of future infrastructure grants. The grants program is being extended in 2012 and 2013 to include enterprise HIOs, with the requirement that they enable exchange outside of their constituent organizations using NwHIN Direct and/or NwHIN Exchange specifications, as appropriate to their internal architectures and business processes.

California demonstrated the utility of combined directed exchange via NwHIN Direct and query/response exchange via NwHIN Exchange for transitions-of-care summary documents at the Interoperability Showcase as part of the

HIMSS 2012 Annual Conference and Exhibition. This demonstration illustrated the strategic architecture for statewide exchange in California, and the strategy for care summary exchange with unaffiliated providers between HIOs. California is beginning to see a shift from an environment of HIOs that always offer both governance and technical services to an alternative structure that includes governance as the sole responsibility of the HIO, and technical services provided by a separate service provider.

Direct is in fact largely modeled on a service-provider approach – thus the Direct HISP. To a limited extent, we are beginning to see service providers that not only provide Direct services, but that also provide traditional results delivery via HL7 standards and query/response capabilities normally expected of traditional HIOs. Our strategy is to include Direct HISPs, these emerging HIE service providers, as well as traditional HIOs as organizations that exchange via NwHIN Direct and NwHIN Exchange specifications. Like enterprise HIOs, the grants program in 2012 and 2013 will be extended to service providers where supported by a prime HIO that provides governance.

To support inter-HIO exchange of care summaries, California will:

1) Continue to fund expansion of existing HIOs to implement Direct for directed exchange of care summaries through 2012 and 2013, with a focus on enabling patient summary exchange during transitions of care.

2) Fund the expansion of existing HIOs to implement NwHIN Exchange for query/response exchange of care summaries through 2012 and 2013, again with a focus on enabling patient summary exchange during transitions of care.

3) Expand the infrastructure grants program to include enterprise HIOs that agree to extend exchange outside of their enterprise, and to service providers allied with an HIO that provides governance.

4) Participate in national demonstrations and pilot programs sponsored by ONC and the State through 2012 and 2013, to demonstrate the utility of the combined use of NwHINB Direct and NwHIN Exchange mechanisms for meeting the meaningful use criterion and establishing sustainable exchange services.

5) Monitor the market demand and adoption of Direct exchange and Direct HISP services.

1.9.3.4 DIRECTORY AND TRUST SERVICES

ONC and the State of California have identified individual and organizational provider identity management as a critical component of trusted health information exchange. Through the Direct Project and the S&I Framework, ONC began exploring standards for "provider directories" using a number of potential technologies, including LDAP, HPD, DNS, and PKI.

Directory and trust services are a keystone of California's overall exchange strategy that establishes mechanisms to (1) locate unaffiliated exchange partners and (2) establish their identity, not only as part of our strategy for exchanging care summaries, but for more generalized trusted exchange of health information as well. The diverse California landscape is such that a single, centralized repository of all provider information is neither affordable nor maintainable. **Therefore, California envisions a federated approach to identity management, in which directory services are rooted at a statewide authority, and organizations that traditionally manage provider information continue to do so by maintaining their own local provider directories.** A set of policies, operational procedures, and technical standards link the separate directories into a trusted whole.

California has recently launched its initiative to define a federated approach to directory and trust services that leverages national standards whenever possible, aligns with the exchange environment in California, and can be reused by other states and to support interstate exchange. This initiative will identify:

- The policies and operating procedures for directory and trust services, concentrating on business processes that must be supported, policy considerations, and procedures associated with operating trusted services.

- The technical architecture, interfaces, and implementation guidance that support those business processes, policies, and procedures, and define directory and trust services.

In order to participate in statewide trust, California will require participating HIOs and service providers to adopt the policies and procedures for identity management, and conform to a set of consensus technical standards for interfaces to their provider directories to create federation.

Therefore, to further support inter-HIO exchange of care summaries, California will:

6) Establish a set of pilot specifications for federated directory and trust services to establish and maintain individual and organizational provider identity, based on the provider directory and certificate management

guidance of the Direct Project and S&I Framework to every extent possible.

7) Pilot an implementation of the federated directory and trust services in 2012.

8) Operationalize the federated directory and trust services in 2013 based on lessons learned during the pilot.

9) Encourage HIOs and service providers in California to participate in directory and trust services as a requirement of the infrastructure grant program through 2012 and 2013, and using market pressures on vendors to support an open implementation standard.

Directory and trust services are an important part of a larger model agreement program that will provide HIOs and service providers with a model for policies for exchange of health information. Participation in directory and trust services is an important component of these model agreements for inter-HIO exchange, as the services established a shared basis for trusted exchange.

1.9.3.5 INTERSTATE EXCHANGE

California is a core member of the Western States Consortium, which is working to establish the policies and procedures for managing and communicating provider identity for interstate exchange. Participation in the Western States Consortium is strategically important to California to ensure that its strategy and plan for directory and trust services aligns with the requirements for interstate exchange.

The use case adopted by ONC for the Western States Consortium is limited to the directed exchange, using NwHIN Direct, of health information between providers for treatment purposes. The demonstration planned for the end of 2012 will be limited to this narrow use case as well. However, California and Oregon, the lead states in the Western States Consortium, have agreed to consider other use cases, including query/response exchange, exchange between other stakeholders, and other exchange purposes as we outline the policies and procedures that govern interstate exchange. California will apply these considerations to our own directory and trust services.

To further support inter-HIO exchange of care summaries, California will:

10) Extend the pilot for directory and trust services to include a demonstration with the Western States Consortium for interstate exchange using Direct by the end of 2012.

11) Apply the lessons learned in this demonstration as we move directory and trust services to production.

1.9.3.6 PROVIDER OPTIONS FOR CARE SUMMARY EXCHANGE

California's strategy for unaffiliated providers is dependent upon every provider having access to an HIO or service provider. Despite numerous successful HIOs, many geographies still exist within California that have no HIO presence, and many providers do not see value in becoming a member of an HIO.

To offer options to these providers, **California will establish a "HISP marketplace," a qualified list of HISP vendors providing Direct services that meet a set of consensus requirements for directed exchange of care summaries (and other health information) in California.** Other states have adopted a similar approach, and lessons learned from these initiatives will be applied to our approach in California.

The activities of the Direct Trust and other groups are working to establish a set of criteria by which Direct HISPs may be accredited and trusted. We will leverage the activities of these groups as well, avoiding a special set of requirements for HISP vendors in California to the extent possible.
An important requirement, however, will be to participate fully in the directory and trust services key to the trust environment in California and our approach to interstate exchange.

California will continue to promote Direct services within HIOs in California as well. It is possible – perhaps likely – that HIOs will offer Direct services not only to their regional constituents, but also to providers outside of their direct geography as a business advantage to support sustainability. Therefore, HIOs may participate in the HISP marketplace.

In order to establish options for providers, California will:

1) Create a list of qualified HISP providers by Q3 2012.

2) Continue to fund expansion of existing HIOs to implement Direct for directed exchange of care summaries through 2012 and 2013, with a focus on enabling patient summary exchange during transitions of care.

3) Link each HISP, whether HIO or independent vendor implementation, to directory and trust services beginning in 2012.

4) Monitor the market demand and adoption of Direct exchange and Direct HISP services.

1.9.3.7 TIMELINE AND MILESTONES

Table 25 lists the consolidated list of milestones for implementing the strategy to support care summary exchange.

TABLE 25. SUPPORT CARE SUMMARY TIMELINE

Milestone	Completed
Establish a list of qualified vendors to establish HISP marketplace.	Q3 2012
Demonstrate care summary exchange at California Connects, a vendor and HIO exhibition of standardized exchange in California.	Q3 2012
Establish architecture and interface specifications for federated directory and trust services.	Q3 2012
Establish policies and procedures for directory and trust services.	Q3 2012
Establish policies and procedures for interstate exchange through Western States Consortium.	Q3 2012
Establish pilot implementation of directory and trust services.	Q4 2012
Demonstrate interstate exchange using Direct and directory and trust services through Western States Consortium.	Q4 2012
Demonstrate care summary exchange using federated directory and trust services and directed and query/response exchange at 2013 Interoperability Showcase.	Q1 2013
Deploy production directory and trust services.	Q2 2013
Support at least one additional Direct implementation within a California HIO.	Q3 2013
Link all HISP providers and HIOs to production directory and trust services.	Q2 2013

Care Summary Exchange Program Budget: $223,427

1.9.4 IMMUNIZATION REGISTRIES

California has incrementally developed a collaborative system of regional and county immunization registries, collectively known as the California Immunization Registry (CAIR), as described in Section 1.8.6.2. Within each region, CAIR allows users to see patient demographic data, immunization history, immunization forecasting, contraindications, overdue immunizations, and other functions. The majority of exchange between immunization registries and EHRs involves the transfer of updated immunization data. For this kind of information, prompt, rather than real-time, exchange is sufficient.

Agency has established as a consensus standard the specification identified in Stage 1 Meaningful Use EHR certification criteria for submitting immunization records. The State strategy is to utilize community and enterprise HIOs to aggregate immunization records from EHRs among their data sharing partners, submitting them using a single public health gateway service which interfaces to CAIR and/or individual regional and county registries. Providers that do not have access to an HIO may connect to the gateway directly. This single gateway will provide a uniform interface that insulates individual EHR or HIE implementations from developing immunization registry capabilities, and properly routes among differing registry jurisdictions.

While initially focused on providing a capability for immunization registries, this project will provide a general approach to accessing other public health resources, such as reportable disease registries and surveillance systems.

TABLE 26. IMMUNIZATION PROJECT TIMELINE

Milestone Name	Expected Completion Date
Establish architecture and publish technical implementation guide for reporting immunizations to regional registries.	Q2 2012
Establish and publish methodology for virtual queue of EPs/ EH's that passed testing and are waiting for production reporting of immunizations.	Q3 2012
Begin implementation of immunization gateway.	Q3 2012
Begin pilot testing of immunization gateway.	Q3 2012
Enter production, accepting immunizations conforming to meaningful use standards, in all jurisdictions and counties.	Q4 2012

Immunization Registries Program Budget: $379,429. A small portion of the budget will go to Build Capacity of Public Health Systems, reserving perhaps 80% exclusively for this section.

1.9.5 BUILD CAPACITY OF PUBLIC HEALTH SYSTEMS

California organizes public health reporting around 61 local health departments. Most do not currently have the capability for receiving electronic lab results. The strategy for building the capacity for public health reporting has two primary activities:

1) Extend the immunization gateway concept to provide a single reporting mechanism for all providers and labs.

2) Provide technical assistance to local health departments to enable them to consume electronic lab results submitted to the gateway.

Like immunization reporting, submission of electronic lab results will adopt the standards called out in Stage 1 Meaningful Use certification criteria, and establish a single gateway service for all submissions utilizing community and enterprise HIOs as aggregators where they exist. This approach simplifies the reporting requirements for providers, and eases compliance with meaningful use requirements.

The gateway will take receipt of electronic lab results from providers. To enable receipt by local health departments, the State will initiate a technical assistance program to enable existing public health systems to receive electronic lab reports routed from the gateway. The intent is to continue to use standards required by Stage 1 Meaningful Use certification criteria so as not to create a California-specific standard.

TABLE 27. PUBLIC HEALTH PROJECT TIMELINE

Milestone Name	Expected Completion Date
Establish architecture for reporting lab results for reportable conditions that extends the immunization gateway and can be used in all counties and jurisdictions.	Q3 2012
Develop draft implementation guide for public health reporting.	Q3 2012
Begin implementation of public health reporting gateway.	Q4 2012
Begin pilot testing of public health gateway.	Q1 2013
Enter production, accepting lab results conforming to meaningful use standards, in all jurisdictions and counties.	Q1 2013
Establish a technical assistance program for local health departments.	Q4 2012
Initiate a technical assistance program for local health departments.	Q4 2012
Enable receipt of electronic lab results in all local health departments.	Q3 2013

Public Health Program Budget: $379,429. (Perhaps 20% of the budget goes for this section.)

1.9.6 ENABLE E-REPORTING OF MU AND CQM TO MEDICARE AND MEDI-CAL

The future partner and new CMIO will be instrumental in development of required Medi-Cal and Medicare reporting. We will comply with future requirements as they are defined.

1.9.7 HIE GRANT PROGRAMS

The Cal eConnect grant program aims to stimulate robust HIE in California for provider achievement of Meaningful Use exchange objectives, coordinated care to improve health outcomes, and efficient reporting to state and federal agencies. Funding is targeted toward HIE initiatives, provider organizations, pharmacies, and laboratories.

Support for ancillary providers through the pharmacy grant program and laboratory grants and technical assistance are described above. This section will focus on grant programs for HIE initiatives and providers:

- Existing grant program
    - HIE Expansion Grants
- Recently launched grant programs
    - Planning, Infrastructure, Innovation, and Interface support

<u>Expansion Grant Program</u>

The HIE Expansion Grant Program supports community-based organizations to increase robust exchange between unaffiliated health care entities within regional medical service areas in California. By supporting HIE organizations in the implementation of key milestones (e.g., developing and testing interfaces, obtaining signed participation agreements, performing outreach to providers), the goal is to increase the adoption and use of HIE services, improve care delivery and coordination, and enable providers to meet Meaningful Use exchange objectives.

Five HIE organizations -- LANES, OCPRHIO, EKCITA, Redwood MedNet, and NCHIN -- were awarded a total of $3.1 million dollars for 18-month projects lasting from June 2011 through November 2012. Expansion Grantees and other community HIOs support the following PIN priorities in California:

TABLE 28. PIN PRIORITIES FOR EXPANSION GRANTEES

	Total # of Community-based HIOs offering (n=12)	
Transaction Type	**2012**	**2013**
PIN Priority Areas:		
Lab Results Delivery	11	13
Patient Care Summaries	8	10
Immunizations (Public Health)	7	8
ePrescribing	5	5
Syndromic Surveillance (Public Health)	5	7

New Grant Programs

Agency will offer four new grant opportunities directed toward HIE initiatives and providers represented in Table 29 below. A call for letters of intent was released in May 2012 and proposals will be reviewed over the summer. Each of these new programs will require awardees to address ONC PIN priorities.

TABLE 29. NEW GRANT PROGRAMS

HIE Grant Opportunities				
Grant Name	**Planning**	**Infrastructure**	**Innovation**	**Interface Support**
Total Funds Available*	$200,000	$1.5 million	$500,000	$1 million
Award Amounts	$25,000, plus technical assistance from CeC-engaged consultant	Up to $500,000	Up to $250,000	Up to $10,000 per interface
Purpose	Community planning and governance development for data exchange within 12 months	Implementation of HIE infrastructure for initiatives with high population impact and/or broad geographic scope	Innovative projects with potential to produce breakthrough results and to scale statewide	Support and technical assistance for interfaces between HIOs**, provider EHRs, pharmacies, labs, and public health systems
Length of Projects	Up to 6 months (plus additional 6-month reporting period)			1-6 months
Project Period	Cycle 1: September 2012-February 2013 Cycle 2: December 2012-May 2013			Start date in fall 2012
Eligible Prime Applicants	HIOs, HIE initiatives, provider organizations, local government; not restricted to nonprofit organizations; vendors may not serve as prime applicants			
Exchange Goals	Exchange across unaffiliated organizations and, whenever possible, distinct electronic health record (EHR) systems			
Priority-Area Requirements***	Plan for exchange in 3 out of 4 priority areas	Exchange in 2 out of 4 priority areas	Exchange in 1 out of 4 priority areas	Exchange in 1 out of 4 priority areas
Partner Commitment	Binding letters of commitment to participate in planning process	Signed participation agreements or Business Associate Agreements (BAAs) for data exchange		
Matching-Fund Requirement	50% of CeC award (cash only)	50% of CeC award (cash only)	25% of CeC award (cash only)	TBD

*Funding is contingent upon continued availability of federal HIE Cooperative Agreement funds.
**This includes interfaces between separate health information exchange organizations (HIOs), not just between HIOs and the other types of entities listed here.
***Applicants must familiarize themselves with the ONC Program Information Notices (PINs: ONC-HIE-PIN-001, ONC-HIE-PIN-002, ONC-HIE-PIN-003) released to state HIE Cooperative Agreement Program award recipients.

The ONC exchange priorities detailed in PINs 001 and 002 are summarized below:

1. **E-prescribing**
2. Enabling providers to receive **structured lab results**
3. Facilitating transitions of care by sharing **patient care summaries** across unaffiliated organizations or making similar data available through other means
4. Building the capacity of **public health systems** to accept electronic reporting of immunizations, notifiable diseases, and syndromic surveillance from providers

Agency/CeC will work closely with grantees to integrate their activities targeting ONC PIN priorities with allied efforts in each of these areas.

Agency acknowledges that demonstrating progress and the tangible results of implementation efforts is critical to encouraging participation in HIE, maintaining provider/user buy-in and trust, and establishing the long-term sustainability of health information exchange. Both state and national stakeholders seek to understand how the HIE Cooperative Agreement funds are enabling exchange and supporting providers meet Meaningful Use in California.

Agency is monitoring and tracking key Meaningful Use HIE capabilities in the state. Table 30 provides the measures and targets for key measures outlined by the ONC for reporting progress.

TABLE 30: TRACKING PROGRAM PROGRESS

	Report in first SOP update	
Program Priority	**Status as of December 2011**	**Target for December 2012**
1. % of pharmacies participating in e-prescribing	89.5%	94%
2. % of labs sending electronic lab results to providers in a structured format	34% (June 2012)	50%
3. % of labs sending electronic results to providers using LOINC	13% (June 2012)	30%
4. % of hospitals sharing electronic care summaries with unaffiliated hospitals and providers	23.6%	45%
5. % of ambulatory providers electronically sharing care summaries with other providers	43.5%	60%
6. Public Health agencies receiving ELR data produced by EHRs or other electronic sources. Data are received using HL7, 2.5.1 LOINC and SNOMED. Yes/No or %	2%	50%
7. Immunization registries receiving electronic immunization data produced by EHRs. Data are received in HL7 2.3.1 or 2.5.1 formats using CVX code.	15%	100%
8. Public Health agencies receiving electronic syndromic surveillance hospital data produced by EHRs in HL7 2/3/1 or 2.5.1 formats (using CDC reference guide).	7%	15%
9. Public Health agencies receiving electronic syndromic surveillance ambulatory data produced by EHRs in HL7 2.3.1 or 2.5.1.	7%	15%

3.1 Overview

As discussed in the Executive Summary of this document, the technological landscape of California is very complex. With very different models of HIE throughout the state, and a very diverse geography and population, California has experienced both many challenges and many successes. **Much time and thought has been given toward how to make California's HIE efforts sustainable for the foreseeable future, thus improving the health and well-being of its citizens for many years to come.**

3.1.1 STATE INFLUENCE AT THE "PAYER" LEVEL

California is focused on sustaining information-sharing efforts at multiple levels of influence. **It is critical to sustainability that providers unable to make investments in HIE infrastructure are not left behind as private health systems with financial means develop enterprise HIE connecting their provider network.** However, this circumstance is a potential reality without targeted investments in communities supported by providers serving the publically insured and safety-net populations.

Private Health Plans

Private or enterprise HIEs are being developed currently by many mid-size to large health systems. These investments are being made, and will be sustained, as a cost of doing business. Referring physicians increasingly demand that diagnostic test results are delivered electronically to their office electronic health record (EHR) systems. Clinical care summaries must soon follow in order to achieve Meaningful Use and collect EHR incentive payments. Anticipated payment reform initiatives also require HIE capabilities for more effective coordination across care settings, which in turn supports emerging business models in healthcare. Private health systems will continue to build out enterprise HIEs to meet these growing business needs and recruit community physicians to participate as affiliated data trading partners.

Public Providers

Public hospitals, community health centers, and other providers that primarily serve publically insured and safety-net populations operate on much thinner or even negative margins when compared to providers serving patients under private health plans. However, safety-net providers face the same demands for diagnostic test results flowing into EHRs and clinical care summaries shared electronically among participants in coordinated care models. As a result, many communities have chosen to organize public or community-based health information organizations (HIOs), pooling limited resources to develop and manage shared HIE capabilities necessary to address the healthcare needs of local populations.

Incorporating HIE into Public Health Plans and Managed Care
A number of emerging public HIOs in California include public health plans and Medicaid managed care plans as primary participants and supporters of local HIE initiatives. The success of these initiatives suggests an approach to sustainability of public HIOs and supports the goal of keeping pace with private HIEs connecting private health systems.

While many HIE start-up costs will be covered under the HIE Cooperative Agreement grant and 90/10 Administrative funds, **long-term sustainability is the key to achieving the benefits of HIE to patient care.** As Medi-Cal beneficiaries are transitioning to managed-care plans across California, we have an opportunity to incorporate health IT adoption and health information exchange requirements into these plans. Managed care plans are early representations of anticipated payment reform models, including integrated care for dual eligibles, which demonstrate an increasing demand for HIE and can clearly serve as HIE sustainability partners for public HIOs in regional communities.

California identifies similar opportunities for public payors to influence the HIE sustainability across the state. Like Medi-Cal plans, Children's Health Insurance Programs at the state and county level share the need for those covered to have their health information available at the point of care. This would obviously include a strong need for children's immunization records to be readily accessible in electronic format. Nearly one million children are covered by these public health plans.

In addition to the previous programs, other opportunities also exist. **The California Public Employees Retirement System (CalPERS) is the third largest purchaser of health care in the nation, covering more than 1.3 million people.** The California Correctional Health Care Services is responsible for another 170,000 lives incarcerated in state prisons. In each of these cases, as in the case of Medi-Cal programs, there is the opportunity for the HIT Coordinator to work with state of California leadership to deliberately incorporate health IT adoption and health information exchange requirements into these plans, consistent with other state and federal healthcare reform initiatives.

3.1.2 ALIGNMENT WITH THE MEDI-CAL EHR INCENTIVE PROGRAM

According to CMS's Ten Guiding Principles for 90%, HIE activities should be directly related to the Medicaid EHR Incentive Program. The State Medicaid Director's (SMD) letter from June, 2010, says that HIE promotion activities must:

- Have costs that are divided equitably across other payers base on fair share principles and are appropriately allocated

- Leverage efficiencies with the ONC HIE funding
- Be developmental and time-limited in nature.

The Medi-Cal EHR Incentive Program is aligning its benchmarks, approaches, and performance goals with the ONC funded Cooperative Agreement Grant Program. Agency anticipates that ONC and CMS will jointly evaluate the state's HIE sustainability model.

DHCS collaborates in full partnership with Agency (and serves on multiple internal and external Agency stakeholders' HIE committees) to define an HIE model that will include the following characteristics:

- Plays a significant role in the electronic reporting of Meaningful Use and clinical quality measure data from Medi-Cal providers to the state and CMS;
- Is directly focused on enabling providers to meet meaningful use requirements, such as pharmacy, lab and clinical summary exchange;
- Provides immediate value to providers through affordable services that help them meet meaningful use requirements and coordinate and improve patient care;
- Is governed by state-level policies, accreditation processes and exchange standards that are aligned with federal policy; and
- Is actively engaged with state government.

California's plan to promote and support health information exchange will leverage the HITECH 90% FFP as part of an overall financial plan that incorporates multiple funding sources to develop and maintain HIEs between hospitals, health systems and individual practices.

This will likely include various federal and state funding sources, as well as contributions by commercial payers, large employers, integrated delivery networks, and associate entities such as laboratories and registries.

Entering into public/private partnerships to develop HIE infrastructure makes sense as the efficiencies and quality improvements associated with HIE build. In addition, the governance and risks associated with developing HIE infrastructure, such as seeking provider buy-in, should not be borne predominantly by a single payer. HIE strategies need to be developed with broad stakeholder involvement with the Medi-Cal program to ensure that the marketplace is balanced to support both public and private health systems' business cases.

While engaging the state's health plan stakeholders, the state can remind payers that the Medical Loss Ratio final rule published on December 7, 2011,

makes references to health information technology expenses that a private insurance may include in the share of the premium that it must devote to health care services and quality improvement activities (QIA). Under § 158.150(a), health insurance issuers are required to submit an annual report to the Secretary documenting their expenditures for activities that improve health care quality.

What defines a QIA? In order for an activity to be considered a QIA, it must be designed, among other things, to improve health quality and increase the likelihood of desired health outcomes in ways that are capable of being objectively measured and of producing verifiable results and achievements. In addition, the activity must be primarily designed to:

- improve health outcomes
- prevent hospital readmissions
- improve patient safety
- implement, promote and increase wellness and health activities.

By taking a collaborative and informed approach with the Medi-Cal EHR Incentive Program, federal and state investments will be carefully and measurably directed to develop and support HIE. Whether HIE is employed as part of Meaningful Use of EHRs, for enhancing care coordination and medical home strategies, or as enablers of new provider payment models, HIE is an essential tool for improving individual and population health and reducing unnecessary costs.

3.2 Conditions for Sustainability of Health Information Exchange

Trust Environment for HIE

Uncertainty regarding legal and policy issues is holding many organizations back from participating in robust health information exchange (HIE) with unaffiliated entities in California. Ongoing confusion over the variable interpretation of state and federal law and associated concerns over liability arising out of data sharing are at the heart of this dynamic. Please refer to Section 5 to read more about how California is tackling these privacy and security issues.

According to a recent assessment performed for CeC, there is general acknowledgement of the need to underpin all stakeholder relationships where Individually Identifiable Health Information (IIHI) is being exchanged with an appropriate legal framework. However, the availability and application of trusted legal agreements in support of health information exchange is limited. Please refer to Section 5.3 for a detailed explanation of how California is working toward ensuring a trust environment for HIE.

3.2.1 ADVANCE CARE COORDINATION MODELS AND PAYMENT REFORM INITIATIVES

California is continuing to advance changes and transformations in the delivery of health care that will have the opportunity to leverage and support health information exchange. Recognizing the importance of policy to drive improvements that will require transformations, California is participating in a number of programs that are driving changes.

Examples of these programs include components of the Medicaid 1115 Waiver such as the Delivery System Reform Incentive Pool (DSRIP) Program, and the transitioning the Seniors and Persons with Disabilities (SPD) population into Medi-Cal Managed Care. Another example is a pilot program to integrate care for dual eligible individuals. While these programs were initiated to support care transformation, California also believes that these programs highlight the need for coordination of care and thus potential need for health information exchange. Moving forward, California will explore potential levers with programs such as these to identify policies that will support increased demand for health information exchange and will streamline reporting requirements to local, state and federal governmental entities.

Here are a few of these programs:

- ***Advance Patient Safety in California's Public Hospitals.*** The Delivery System Reform Incentive Pool (DSRIP) Program is an important component of the 1115(a) Medicaid Demonstration program, "Bridge to Reform." A significant portion of the DSRIP Program is devoted to patient safety. Details of this work can be found at: http://www.dhcs.ca.gov/provgovpart/Pages/DSRIP1.aspx. Two areas of focus for all 17 public hospital systems are: (1) improved detection and management of sepsis (serious, life-threating blood infections); and (2) central line-associated bloodstream infection prevention. In addition, each public hospital system will be implementing other quality improvement initiatives that are relevant to the individual institutions. Each quality improvement focus will: (1) specify a measureable impact on population health; (2) have a strong evidence base; and (3) have the potential to reduce morbidity, mortality, or both in the public hospital population.

- ***Improve Care Coordination for the Seniors and Persons with Disabilities Population.*** The 1115 Waiver allows DHCS to achieve care coordination, better manage chronic conditions, and improve health outcomes by transitioning the Seniors and Persons with Disabilities (SPD) population into Medi-Cal Managed Care. Beginning June 2011, DHCS began enrolling the SPD population into managed care in 16 counties. The Governor's 2012-13 proposed budget proposes to expand Medi-Cal managed care statewide starting in June 2013. The proposal combines strong beneficiary protections with centralized responsibility

for the broader continuum of care. This combination will promote accountability and coordination, align financial incentives and improve care continuity across medical services, long-term services, and behavioral health services.

- ***Integrate Care for Dual Eligible Individuals.*** DHCS is developing a pilot program to test innovative payment and person-centered delivery models that integrate the full range of acute, behavioral health, and long-term supports and services for members that are dually eligible for Medicare and Medi-Cal. DHCS will pursue newly available federal funding to support this work through the federal Coordinated Health Care Office. The pilot goals are to: 1) coordinate Medicare and Medi-Cal benefits across care settings; 2) maximize the ability of dually eligible individuals to remain in their homes and communities with appropriate services and supports in lieu of institutional care; and 3) minimize or eliminate cost-shifting between Medicare and Medicaid. DHCS aims to achieve significant efficiencies and improved care for members that are dually eligible.

3.2.2 FOSTER SYSTEMIC CHANGES TO SUPPORT HIE

Now more than ever, it's necessary to support patient-centered care, self-management and effective use of health care resources. [12]**Overall, electronic PHRs, together with health information exchange solutions, may be essential for improved quality of care and the nationwide health information network.** [13]Importantly, patients seem to be ready to use PHRs to help them manage their personal health information.

The improvements in quality when using a PHR include safety, timeliness, effectiveness, efficiency, equity, and patient centeredness of health care. The concept of a PHR, however, should not be limited to an information repository, but should stimulate actions that support personal health. A PHR has the potential to improve patient-provider relationships, discussions, and shared decision-making. Personal health records can supplement and improve patient and family access to information for health and wellness. The comprehensive nature of PHRs empowers patients to understand their health

[12] PF Brennan, S. D. (2010). Project HealthDesign: Rethinking the power and potential of personal health records. *43*.

[13] Council on Clinical Information Technology. (July 2009). Policy Statement - Using PHR to Improve the Quality of Health Care for Children. *Pediatrics,* 403.409.

and the care they receive — while facilitating the communication between the patient and the care team.

Vulnerable Populations
California has identified key programs aimed at fostering systemic changes that are necessary to support health information exchange in two vulnerable populations: foster children and seniors with disabilities requiring home health care.

California's goal: To improve the quality and continuity of care for California's foster children and long-term care patients using personal health record (PHR) technology to enable connectivity and information sharing across multiple care systems, provider types, and state and local health agencies.

Our progress so far toward this goal:

- Determined the specific size, scope and need for PHR deployment in two vulnerable populations: foster care and long-term care (See ONC Bold Audacious Goal at http://ehealth.ca.gov/MakingHIEHappen/CaliforniaseHealthPlans.aspx)

- Collaborated across state departments and private sector projects to determine state IT infrastructure requirements for information exchange via PHR technology.

- Identified key privacy issues that need to be addressed.

Ongoing projects involving these two populations exist, which are expanding to include the use of personal health records (PHRs). While evidence regarding the benefits of PHRs is still limited, studies have shown that disease-specific HIT applications help engage patients in their healthcare and improve the delivery of traditional clinical interventions. [14] [15] In addition, strong evidence exists that electronic health systems will be used extensively and with a positive impact on underserved minority population. [16]PHRs targeted to unique

[14] DC Kaelber, A. J. (2008). A Research Agenda for Personal Health Records (PHRs). *JAMIA, 15*, 729-736.

[15] Patel VN, E. A. (2011, April). Consumer Attitudes Towar Personal Health Records in a Beacon Community. *American Journal of Managed Care, 17*(4), e104-e120.

[16] DH Gustafson, F. M. (2005). Use and Impact of eHealth System by Low-income Women with Breast Cancer. *Journal of Health Communication, 10*, 195-218.

populations may serve to improve quality and coordination of care in other vulnerable populations.

Foster Care
In the pediatric population of foster children, PHRs can provide pediatricians with vital information on events occurring at home and in school, as well as connect immunization and newborn screening registries with all relevant stakeholders (patients, providers and regional health information organizations). **A goal is creating a PHR at birth, to be used for the rest of life.** In addition, PHR for foster children can be expanded to include a safe place to store other important documents that these children need, such as their birth certificate. The PHR should be able to function as both a repository of health history and a system to ensure proper preventive services are completed, such as immunizations. In addition to benefits to the child, a PHR also has the potential to benefit society, supporting efforts such as immunization registries, bio-surveillance, and public health monitoring. [17]

Health IT Education
We believe Health IT education is a key component of HIE sustainability. However, California is currently lacking in health professional training programs; we are working to change this. Clinician education and training can be encouraged through a number of avenues, including professional education and postgraduate clinical training experiences. Introducing concepts of health IT safety early in professional clinical training allows clinicians to learn how to use and practice delivery of care safely and effectively with an existing technology.

Almost all health IT technologies are configured differently. Therefore, it's also important to become trained in a local context, such as a hospital, clinic, or pharmacy setting. **We believe that specific and comprehensive programs that focus more on inter-professional use of health IT are needed, and that health professional curriculum that provides inter-professional, standardized and consistent health IT training will improve successful adoption and use of health IT and lead to improvements in patient safety.**

Providers, institutions, and pharmacies need help now to improve increased adoption and effective use of EHRs and HIE. These stakeholders cannot wait for the training to catch up to their current needs. As a result, a combination of academic training for health professional students and on-site technical support

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[17] NM Lytle, J. S. (n.d.). *Uncovering Interests and COncerns About Personal Health Record Use By Individuals with Disabilities: Results of a Preliminary Survey.* Retrieved September 16, 2011, from American Association of People with Disabilities:

for existing providers and pharmacies will be necessary to improve the effective use of health IT.

There are several barriers to effective use of health IT:

- Systems and providers must adopt it.
- Users must be appropriately trained to use health IT, and barriers to effective use need to be identified and resolved based on system-specific needs.
- Health IT may introduce new safety concerns not previously encountered which will need to be addressed.

Although adoption of health IT is a critical first step to promote improved patient safety, it is widely understood that merely installing health IT in health care organizations will not result in improved care. The design, implementation and use of health IT will affect its safe performance. Safer implementation and use of health IT is a complex, dynamic process that requires a shared responsibility between vendors, health care organizations and the public sector. We need for an organized, trained workforce to support enhanced adoption and improved use of health IT and HIE.

Maximizing the Safety of Technology-based Healthcare

In this time of rapid adoption of Health IT, how can private and public organizations maximize the safety of technology-based health care? The Office of the National Coordinator for Health Information Technology (ONC), asked the Institutes of Medicine (IOM) to establish a committee to find out. In response, the IOM established the Committee on Patient Safety and Health Information Technology, which released a report on November 8, 2011.[13] The report, entitled *Health IT and Patient Safety: Building Safer Systems for Better Care*, identified the lack of data as a major barrier in quantifying the harm that might result from health IT. It cited several reasons health IT–related safety data are lacking, including the absence of quantitative and qualitative measurements of errors and the absence of a central repository (or linkages among decentralized repositories) to collect, analyze, and act on information related to safety of this technology.

Partners in E: Promoting Safer Use of Electronic Health Records (EHRs) for Better Care

As introduced in Section 1.8, *Partners in E* is an innovative program that is important to the success of HIE sustainability in California. This program is modeled after two successful teaching programs developed by the UCSF Department of Clinical Pharmacy on both state and national levels. These programs have proven results and extensive literature supports their success.[1,2] Further, they are sustainable with the training programs continuing well beyond the duration of funding.

Partners in E will use a similar process for evaluation, education, and outreach; here we'll describe in more details the goals we introduced earlier in this document.

Goal 1: *Create a cross-disciplinary learning environment for health IT among health professionals that is focused on shared learning, maximizing transparency and minimizes the burden of Electronic Health Record (EHR) adoption to providers. This goal is to be accomplished by developing and disseminating and interdisciplinary health IT curriculum throughout California.* A number of leading health professional organizations, including the American Society of Health-System Pharmacists, the American Medical Informatics Association and the American Nursing Association, have emphasized the need for informatics-trained clinicians.[14-16] In 2003, the IOM convened a multidisciplinary panel of healthcare professional leaders to identify strategies for reforming clinician education. There, they identified five core competencies for all health professionals, one of which was using the tools and techniques of informatics.[17]

Nationwide, there is a lack of formal informatics training provided to health professional students, but there is consensus among health professional students regarding the need for proper informatics training.[18-20] In schools that do provide such education, instruction is typically taught within specific professional disciplines, e.g. nursing, medical, and pharmacy. Such siloed training does not permit health professional students to learn about the barriers and opportunities that health IT presents across disciplines. To redress this significant gap in clinician training, we propose to develop and disseminate a novel interdisciplinary health IT curriculum throughout California.

In our model, collaboration and shared learning among medical, nursing, and pharmacy schools will enhance interdisciplinary collaboration and improve the scalability of health IT. Inter-professional training programs will create a cross-disciplinary learning environment for health IT as part of their curriculum. UCSF will collaborate with the University of California, Davis, Schools of Medicine and Nursing to develop a health IT inter-professional training curriculum. This curriculum will be used at train-the-trainer sessions to support the implementation of health IT in selected pharmacy, medical and nursing programs in California. It will help train a clinician workforce equipped with the attitudes, knowledge, and skills necessary to accept health IT in their work environments.

Goal 2: *Educate and deploy a pharmacy student workforce with the attitudes, knowledge, and skills required to identify and resolve barriers to e-prescribing in community pharmacies, a critical component of health IT adoption in California. This goal is to be accomplished by supporting successful health IT adoption in community pharmacies.*

Establish a Pharmacy Extension Center (Rx-REC) at California Schools of Pharmacy:
Working in consultation with California's Regional Extension Centers (CalHIPSO, HITEC-LA, and COREC), local pharmacy associations, provider groups and other stakeholders, California schools of pharmacy will develop Pharmacy Regional Extension Centers (Rx-RECs). The goal of these newly established organizations will be providing onsite technical support for pharmacies identified in geographic regions having large Medi-Cal populations that need and desire assistance to facilitate their adoption of e-prescribing. To meet this need, we will create and implement an innovative education and outreach program designed to train and deploy student pharmacists, under faculty supervision, to provide technical assistance to independent pharmacies enrolled in the Medi-Cal program.

Serving as e-prescribing and medication safety advocates, these pharmacy students will work with pharmacists and their staff to: (1) identify and resolve technological, logistical, workflow and other barriers that preclude pharmacies from adopting e-prescribing; (2) identify medication safety errors resulting from e-prescribing; and (3) identify common problem areas across commonly used systems to facilitate more rapid scalability of the program.

Selection of the First Pharmacy Regional Extension Center (Rx-REC)
Based on the success of previous programs (Partners in D and Rx for Change), UCSF will be the first to pilot and then establish a program of outreach, resources and curricula to disseminate to other California Schools of Pharmacy. This Rx-REC will work with CalHIPSO in Oakland to support community practices in Northern California, especially the Silicon Valley. Staff will be hired to support this new entity including a health IT pharmacist expert, a research analyst and an administrative assistant. These personnel will oversee the outreach activities of the Rx-REC. Another California school of pharmacy will be selected to support the Southern California region working collaboratively with the Southern California REC's (HITEC-LA, and COREC). Initially, the training program will be developed, implemented, and evaluated at UCSF.

The foundational training module will be an elective course entitled, *Health Information Technology for Pharmacists*. Open to UCSF pharmacy students in the Fall 2012 quarter, this course will have two components: (1) a didactic component, which will consist of classroom lectures and case-based laboratory work at the UCSF Pharmacists' Informatics Center; and (2) an experiential component, consisting of student outreach activities at community pharmacies requesting help in accelerating e-prescribing adoption.

Lecture content will be supplemented with interactive case studies and role playing sessions designed to: (1) improve students' knowledge about and attitudes toward health IT, e-prescribing, and medication safety; (2) enhance students' confidence about providing technical assistance to pharmacists and

their staff; (3) improve student's ability to engage vendors, providers and other stakeholders when resolving e-prescribing barriers; and (4) improve students' ability to identify medication errors resulting from e-prescribing.

Community outreach will occur weekly with adopted community pharmacy sites. Pharmacy students will be the primary group deployed to provide the on-site technical support for the community pharmacists and staff. Each week, pharmacies participating in the outreach will be required to complete a problem list worksheet provided by the Rx-REC. This problem list will include (in priority order) the key issues the staff faced in filling e-prescriptions that week. A brief description of the problem, steps taken to resolve the problem, and stakeholders contacted (physician, software vendor, EHR vendor, etc.) will be included on this worksheet.

Students will use this worksheet as the basis for the technical support for the community pharmacy. The student will address unresolved problems and high priority items first. If the student cannot resolve the problem for the community pharmacy on that day, he or she will provide the support off-site with supervision provided by the health IT pharmacist overseeing the UCSF outreach program (at the Pharmacy REC). When problems are resolved, they will coded, collected, and stored in a central database. Follow-up and resolution of the problems will be discussed on-site with all pharmacy staff to maximize transparency and minimize duplication of work.

In addition to weekly meetings with the pharmacies, students will also meet with the health IT expert to report on the progress of the program and to ensure appropriate oversight, accurate data collection, and timely resolution of issues.

Dissemination to Other California Schools of Pharmacy

Once implemented and evaluated, all materials from the *Health Information for Pharmacists* course (lecture content, laboratory-based exercises, and experiential training modules) will be disseminated to eligible pharmacy schools across California for adaptation to their own health IT-learning environments. All outreach activities will be coordinated with Regional Extension Centers (RECs) and pharmacy professional associations, and to ensure the successful adoption and use of health IT in pharmacies across California.

While all schools will have the opportunity to receive the training materials for the *Health IT for Pharmacists* course, not all schools will be selected to provide on-site outreach support as a Rx-REC. They may be selected to participate in the on-site outreach program only if they have a geographic proximity to a high need area (e.g., Los Angeles and Orange Counties) and provide specific deliverables demonstrating a commitment to the program. These deliverables include:

1. Full integration and adoption of curriculum by the school (e.g., as an official elective or required course);

2. Development of an outreach plan and policies and procedures for deployment of students as on-site outreach support for community pharmacies;
3. Identification of a dedicated faculty person committed to participating in teaching the *Health IT for Pharmacists* course and overseeing its outreach component;
4. Accurate and complete data collection on participating students', pharmacists', and pharmacy staff's knowledge, attitudes, skill mastery as it relates to health IT and e-prescribing;
5. Contribution to the data repository on health IT patient safety (see Goal 3 below).

Goal 3: *Evaluate the current state of health IT on patient safety and identify strategies to minimize the risk of its implementation and use. To be accomplished through the development of a statewide health IT incident reporting system to identify health IT related errors and strategies utilized to resolve and prevent future errors from occurring.*

Unfortunately, there is not enough research available on the unforeseen adverse events caused by new health IT. The November 8, 2011 IOM report made clear that improved documentation of these incidents with an understanding of the root cause, circumstances, and environment associated with adverse events related to health IT are critical to ensure improved patient safety. A central repository that will analyze and disseminate potential and actual adverse events seen with health IT and e-prescribing will help stakeholders and policy makers understand barriers and safety concerns with the new technology. The database should be used to document, monitor, and advocate the use of safe practices, including measures specifically related to the design, implementation, usability, and safe use of health IT by all users, including patients. The frequency and variation of these prescription errors can alert both pharmacy and provider staff to pursue the cause and document changes necessary to prevent future errors.

Partners in E will develop, maintain and evaluate such a database. Students and other users will document adverse events into a central repository which will be aggregated and evaluated regularly by UCSF and participating schools. These adverse events will be disseminated to stakeholders and policymakers in peer-reviewed publications.

3.2.3 CALIFORNIA'S HEALTH INFORMATION TECHNOLOGY AND EXCHANGE FUND

Because of its complex nature, the transformation of California health information infrastructure will extend far beyond the initial four years of California's current State Cooperative Agreement with the Office of the National Coordinator.

Recognizing that sustaining the health information exchange effort is of critical importance, California added section 130255 to the Health and Safety Code (H&SC) in 2010, which created the Health Information Technology and Exchange Fund. The new Fund is a special state fund whose purpose is to hold any public and private funds awarded, contributed, and earned to be dedicated toward the continued support for programs and activities that continue to advance California's health information exchange efforts. **This creates a potential permanent funding source for HIE programs and activities once the federal grant is ended.**

In addition to establishing a special HIE account, H&SC 130255 also acknowledges Agency's continued leadership for California HIE efforts. Specifically, H&SC 130255 allows Agency to convene an advisory panel on the issue of sustainability of HIE, and utilize the Health Information Technology and Exchange Fund to hold any funds raised through public private partnership efforts. (Please go to Appendix A to read H&SC 130255).

3.3 Business Sustainability of Services Directly Offered or Enabled

Cooperative Agreement funds enable HIE in California medical communities through a sub-grant program and through a number of additional state-level programs and services. As described in the Environmental Scan section of this Strategic and Operational Plan, key characteristics of community HIE initiatives in California include:

- Exchange across unaffiliated partners
- Geographic footprints shaped by medical trading areas and counties
- Participants include advanced hospital/health systems, safety-net providers, county health departments, independent provider practices, medical groups, Medicaid managed care plans, laboratories, pharmacies, and others
- A mix of exchange models, but most support some form of query-based exchange
- A mix of operational and pre-operational efforts throughout state (by the end of 2013, over 75% of counties will have community-based HIEs in the planning or operational stages)

A recent assessment[18] by CeC produced the following findings on revenue models being implemented by these community HIEs:

- ***Participation model most prevalent*** Beyond grant funds, the most used revenue model is the participation model, which includes a sliding

[18] "Cal eConnect HIE Capability and Capacity Assessment," Top Tier Consulting, forthcoming.

scale of fees for implementation, interface, basic HIE services and menu based services.

- ***Some models enable earlier fee generation.*** Some HIEs have had success in moving implementations forward by having stakeholder organizations make an initial investment in the entity for startup operating costs. The benefit is that the earlier an HIE can go live, the sooner maintenance/subscription fees can be billed. These initiatives often provide discounted or waived subscription fees in years one and/or two of operation in exchange for such an initial investment. These investments have been used by one organization to obtain better pricing for software licenses and/or interfaces. Another approach gaining increasing interest is the use of software-as-a-service (SAAS) or ASP solutions to enable implementation sooner and mitigate specific risks related to security and disaster recovery.
- ***Implementation, subscription and maintenance fees are common among operating organizations.*** As previously mentioned, some obtain these fees up front and defer billing for up to two years, while others collect fees as soon as the development work begins. Still others, mostly those focused on the underserved or White Space, provide participation incentives or discount to these fees such as a "one free interface," typically using grant funds to cover the development costs. Regardless, those using these revenue models have enacted the use of a sliding fee scale, based on the type and size of the stakeholder organization and whether they are a public or private entity. These fees typically are tiered at specific threshold levels based on # of beds, # of MD's in an office or IPA, etc.
- ***Other revenue models are planned or operational.*** In addition to the fees mentioned above, some HIEs are charging fees in addition to their standard subscription, maintenance and implementation fees. These fees are for value-added services such as consulting and technology hosting. A few organizations plan to provide analytics services for a fee in the future, as well. Others plan to negotiate revenue sharing arrangements with participants based on exchange related improvements achieved in various pay-for-performance programs.
- ***Franchising or affiliation fees are being considered.*** Some of the more established Community HIEs are considering franchising their technology by providing HISP services to other HIEs in adjacent geographies or shared medical trading area or stakeholders. This could lead to increased adoption and potentially consolidation of initiatives, as well as increased revenue and stability for the organizations offering these services.

- ***One new model in California.*** Inland Empire HIE (IEHIE) is using a multi-tiered revenue model based on a tiered governance structure. The model provides for a "Leadership Council" that carries voting rights and preferential implementation sequencing in exchange for a substantially higher annual fee. Membership fees make up the second tier, which encompass the "Advisory" and "Operating" committees. Finally, all participants using services pay subscription, maintenance, transaction, training and other value-based fees, where applicable.

Most community/regional HIEs in California face the "…tension between offering services that are self-sustaining and serving communities and providers with the fewest resources" noted in ONC PIN 002, and sustainability remains a significant challenge for many of them. Of the thirteen community HIEs interviewed in this assessment, eight have no specific revenue model determined or approved; one has the model determined, but the exchange is not currently operational; four have operational revenue models, one of which is a model based on telemedicine data exchange only.

Aside from the involvement of Medi-Cal managed care plans, a missing revenue stream is that of the payers, who benefit significantly from the improvements in care quality and efficiency. Planned state-led efforts to engage payers in HIE across California will positively impact the sustainability equation for community HIEs.

Financial support received through sub-grant programs offer grantees capital to implement HIE systems serving significant populations of providers and patients in the state.[19] This funding gives them the chance to cross the tipping point to sustainability after which fees can support ongoing operations. For example, one grantee reported that their sustainability tipping point is 12 hospitals and 1,000 provider participants, generating $500,000-$700,000 in annual revenue to support operations. Cooperative Agreement grant funding is enabling them to reach the half-way point to these numbers in 2012, and with current growth at over 200% per year, they hope to close the remaining gap shortly.

Cooperative Agreement funding is also galvanizing significant matching funds from community HIE stakeholders, solidifying their long-term commitment. The Los Angeles Network for Enhanced Services (LANES), for example, has

[19] Cal eConnect's sub-grant program supported five regional HIE efforts that received Expansion Grants in 2011, with awards totaling $3.1m. They are located in Los Angeles, Orange County, the Central Valley, and the North Coast. As described in the Environmental Scan section (pp. XY), recently launched programs for Planning, Infrastructure, Interface, and Innovation grants will support a broader set of organizations with Cooperative Agreement funds and technical assistance.

received matching fund investments totaling $1 million from LA County and LA Care (the local Medicaid Managed Care Plan). With over six million lives to be entered into the LANES Master Patient Index during the grant period, these organizations are committed to LANES' long-term success to meet their data exchange needs.

Additional state-level programs and services enabled by the Cooperative Agreement are strengthening the value proposition community HIEs can make to current and potential participants. These include:

- **EHR/HIE interoperability specifications.** With vendor collaboration, produced and testing an "orderable kit" of HIE interface requirements for California purchasers of EHRs (RECs, their clients, etc.) to reduce the cost and complexity of implementing HIE interfaces.
- **Gateways to state agencies**. Meaningful Use-compliant public health reporting, including provider immunization reporting via community HIEs to meet current gaps in state infrastructure.
- **HIO-HIO exchange.** Implementations of exchange between HIOs using national standards to demonstrate statewide exchange capabilities via regional HIE initiatives, and exchange between community and enterprise HIEs.
- **Provider identity and trust services** to locate unaffiliated exchange partners and validate their identity, including requirements supporting federal transport mechanisms (Direct).
- **Data exchange policies and model agreements** to establish a trust environment for exchange in California, reducing legal fees for community HIEs and encouraging participation in HIE through mitigating perceived risks.
- **Promotion of common technical standards/specifications** to lower the technical barriers to exchange across disparate systems, including between enterprise and community.
- **Accreditation of Health Information Service Providers (HISPs)** enabling exchange via Direct; community HIEs may apply for HISP accreditation and expand their customer base through offering Direct
- **Interstate exchange** via the protocols developed and tested by the Western States' Consortium.
- A statewide **HIE Community of Practice** and issue-focused task-groups.

These programs and services provide community HIEs with tools and resources to enhance the value and reduce the cost of their offerings. By leveraging these opportunities, many will succeed in the dynamic emerging

market for HIE services in California as they balance a strong commitment to all providers, including those serving the safety net, with the imperative to sustain their operations over time.

4. PROGRAM EVALUATION

California has undertaken a rigorous evaluation strategy when it comes to health technology. In this section, we outline the aims of the evaluation, the evaluation framework (background and context for California's goals, approaches and strategies), and evaluation methods.

4.1 Aims Of The Evaluation

Evaluation aim #1: Describe health information exchange (HIE) approaches and strategies adopted by the State.

> **PIN-002**: "Describe the approaches and strategies used to facilitate and expand health information exchange in the program priority areas and other areas as appropriate for the state's strategy. Program priority areas that must be included are:
>
> a. Laboratories participating in delivering electronic structured lab results
> b. Pharmacies participating in e-prescribing
> c. Providers exchanging patient summary of care records"

Key evaluation questions for aim #1

- **What are the state's goals for HIE?** Stated goals are to:
  - Improve the trust environment
  - Accelerate HIE--especially community--wide health information organization (HIO) progress
  - Implement strategies for supporting electronic health record (EHR) Meaningful Use (MU) through HIE
  - Monitor HIE progress
  - Communicate with and educate stakeholders
- **What are HIE program priority areas**? Priority areas include the following:
  - Expand prescribing, receipt of structured lab results, and care summary exchange (PIN-002)
  - Build Capacity of Public Health Systems
  - Enable e-reporting of MU and CQM to Medicare and Medi-Cal
- **What are approaches and strategies for meeting each HIE goal?**

- How does the state propose to meet each goal? (What are deliverables for each?)

  For example, to improve the trust environment, the state has stated it will:
  - Create model HIE agreements (intra-HIE, HIE-HIE)
  - Create model HIE policies and policy FAQs
  - Adopt inter-state trust policies
  - Make legislative/regulatory recommendations
  - Harmonize laws
  - Launch an HIO accreditation program

Evaluation aim #2: Describe and analyze HIE performance and progress.

> **PIN-002**: "Analyze HIE performance in each of the key program priority areas (e.g., where did your state/territory begin at the start of the program and how have you progressed?). Grantees with operational HIE underway are encouraged to assess participant adoption and use (e.g. measure provider adoption) and analyze its impact (e.g. assess impact on care transitions, patient safety, duplicate lab test ordering, etc.)"

NOTE: The evaluators will select study cases in the following categories of organizations:

- Hospital and health systems
- Medical groups, IPAs, and their management service organizations
- Health plans (Medi-Cal focused and not)
- County health departments
- Regional health information organizations (HIOs)
- The state

Key evaluation questions for aim #2 (organized by type of entity: health care organizations and HIOs)

- **For health care organizations (providers, plans, county health departments, and others)**
  - **What are their organizational characteristics** (that can affect HIE activities)?
    - Facilities, patients served, payer mix, revenues, financial health, parent entity?
    - Types of affiliated providers/medical trading partners?
    - Extent of its EHR adoption and use?
  - **What are their key strategies and approaches** for improving HIE performance, including:
    - Developing private (enterprise) HIEs?
    - Participating in public (regional, community-wide) HIOs? (How do they participate?)

        - Engaging in both?
- **For regional health information organizations**:
    - **What are their organizational characteristics**?
        - Governance
        - Participants
        - Staff
        - Revenues, expenditures
- **For health care organizations *and* regional HIOs**
    - **What HIE software (architecture) and policies do they use?**
        - What are their technical architectures and standards used?
        - How do they exchange data (web browsers, interfaces, alerts)?
        - What are their policies on accessing patient data?
        - How do they integrate private and regional HIE efforts?

What is their HIE performance and progress, including in program priority areas?

        - What data do they exchange with trading partners/participants?
        - What other services do they provide to/use with trading partners/participants?
        - How has HIE performance changed over the past year?
        - What are plans to improve HIE performance?
    - **What are the perceived effects of interventions on their HIE activities?**
        - What is their participation in efforts and what services do they use?
- **For the state**
    - **What are the state's organizational characteristics?**
        - Governance
        - Participants
        - Staff
        - Revenues, expenditures
    - **What is its performance/progress in each goal area, including aims to:**
        - Improve the trust environment?
        - Accelerate HIE--especially accelerate community--wide health information organization (HIO) progress?
        - Implement strategies for supporting EHR meaningful use through HIE?
        - Monitor progress?

        - Communicate with and educate stakeholders?
    - **What are the perceived effects of ONC interventions on their HIE activities?**

Evaluation aim #3: Identify and understand barriers and facilitators to enterprise, regional and statewide HIE efforts.

> **PIN-002**: "Identify and understand conditions that support and hinder implementation of those strategies (e.g. how did your governance model or engagement with stakeholders support your strategy to increase lab exchange activity in your state?"

Key evaluation questions for aim #3

- **For providers organizations, health plans, county health departments and others:**
    - **What are enterprise HIE efforts?**
        - What's the business case for these efforts?
        - Which private HIE services provide the most value (are highest priority?)
        - What are other key barriers, facilitators to these efforts?
        - How sustainable are these efforts?

    What are regional HIE efforts?
        - What's the business case for these efforts?
        - What services provide the most value? (What's the entity's demand for regional HIE services)
        - What are they willing to pay?
        - What are other key barriers, facilitators to these efforts?
        - How sustainable are these efforts?
    - **What are perceptions of state efforts?**
        - What services provide the most value?
        - What effect has the state had on HIE activities? Has it been able to:
            - Improve business cases?
            - Address other barriers and facilitators?
            - Improve the trust environment?
            - Accelerate HIE--especially accelerate community--wide health information organization (HIO) progress
            - Implement strategies for supporting electronic health record meaningful use through HIE?
            - Monitor progress and provide feedback?
            - Communicate with and educate stakeholders?

        - **What else should the state do?**
- **For regional HIOs**
    - **What organizations are participating** or likely to participate?
    - **What's the business case** for providing regional HIO services?
        - What are fees, how were they set?
        - Who pays and how much do they pay?
            - Does payment change due to network scale, increased services?
        - What are other sources of revenue? (For example, grants)
        - What is participant demand for services?
            - Who wants HIO services?
            - What services do they want?
                - Why do they want them? (How do services add value?)
            - What are they willing to pay?
            - Who does not want HIO services?
                - Why don't they want them?
        - What are costs of providing services for major cost centers?
            - What are economies of scale and scope, and network effects?
    - **What are other key challenges**, including technical, privacy and security?
    - **What's the perceived sustainability** of regional HIO efforts?
    - **What effect have HIE activities had on challenges and facilitators?**
        - By type of state approach and strategy?
    - **What else do they want the state to do?**
- **For the state**
    - **What's the business case** for providing each type of services? (Same questions as above for regional HIE services)
    - **What's the perceived effect of state efforts** on California's HIE barriers/facilitators?
    - **What should other entities do to help?**
        - What should the federal government do?
    - **What's the perceived sustainability** of:
        - California's HIE efforts?
    - **What are plans and timelines** (both tentative and firm)?
    - **What are potential plans under consideration**, but not planned?

Evaluation aim #4: Analyze what policies "worked"

PIN-002: "Assess how the key approaches and strategies contributed to progress in these areas, including lessons learned."

Key evaluation questions for aim #4. Questions will focus most on the program priority areas.

- **What were major patterns in HIE performance and progress** by type of organization
    - In particular, are safety-net organizations and small practices serving disadvantaged patients lagging behind similar sized organizations serving other patients?
- **What were major patterns in barriers and facilitators that affected progress**, by type of organization (e.g., are barriers for public hospitals and community health centers different than those for their private counterparts)
- **How well did the state's approaches and strategies appear to meet its goals** to reduce barriers and increase facilitators to HIE, and thereby improve the status and progress of HIE in the state, for different types of organizations?
    - What worked, what did not?
    - Did the state meet its goals?
    - What should change?
- **After the grant period ends, what barriers to HIE are likely to remain**, especially HIE needed for Stage 2 electronic health record Meaningful Use objectives?

Note that we expect results of the program evaluation to inform the PIN-002 requirements on sustainability and tracking progress.

4.2 Evaluation Framework

California's background and context greatly affects the methods needed to evaluate approaches and strategies on program priority outcomes.

- **California is larger than any other state — far larger than most states -- and has many complex regional market areas.** Given modest evaluation resources, some important decisions must be made on how to allocate resources.
- **California's interventions are indirect.** The state of California has adopted a federated approach to its state-wide health information exchange activities, tackling trust environment, technical standards, and other challenges that affect all or key stakeholders and providing select infrastructure services (such as provider directory services), but not creating an organization that directly exchanges patient data. As a result, almost all the state's main goals, strategies and approaches *indirectly* affect California's HIE progress, through improving the trust environment, for example.

- **Many private organizations with ample resources are rapidly expanding private HIEs regardless of the state's efforts.** California's large health care organizations that predominantly serve commercial- and Medicare-insured patients are rapidly developing private HIE capabilities. Since many are capitated and/or are large multispecialty medical groups, they have strong motivations to implement robust HIE.
- **Regional public HIOs are developing relatively slowly and unevenly.** Many large private organizations are focusing on developing their own private HIEs, while safety net and smaller private organizations are focusing on implementing EHRs, which reduces immediate stakeholder interest in HIO participation. As a result, HIO sustainability is unproven.
- **Safety-net provider efforts are lagging and may depend on HIOs going forward.**
    - **Safety-net efforts are lagging.** Public hospitals, community health centers, and some small practices that focus on serving Medi-Cal-insured and uninsured/self-pay (1/3 of California's population) are lagging in HIE relative to large private organizations because they are focused on EHR implementation to achieve Stage 1 EHR Meaningful Use, and not on HIE, and because they have limited resources for paying for HIO subscription fees or making internal HIE-related changes.
    - **Safety-net providers may disproportionately depend on HIO development going forward.** Since many safety-net organizations are "open" care systems that are not predominantly capitated, they'd have to build and maintain many interfaces to trading partners using private HIE software; conversely, public HIOs appear to be less costly and potentially have more data, compared to private HIEs. Public HIOs may be the only way that some safety-net and some small practices can meet stage 2 EHR Meaningful Use patient care summary goals that require HIE.
- **Public health reporting capacity also may depend on HIOs going forward**. State-level developments suggest that substantial public health reporting will take place through regional HIOs, rather than between many private HIEs and public health entities.
- **E-prescribing and receipt of structured lab results challenges are mostly on the provider side, especially for smaller provider entities, and less on the pharmacy and laboratory firm side**. Since over 90% of pharmacies are part of e-prescribing networks, and labs with most of California's test volume are capable of providing structured lab results to providers, the state will have the most effect on HIE progress on the provider side, especially in small practices lacking technical support services. For example, the state could speed progress by standardizing interface software and standards across vendors that reduce costs for implementing interfaces

- **Given this context, the state's strategy and approaches will affect program priority area goals primarily (although not exclusively) though its effect on:**
    - **Regional (public) HIO developments** (rather than through private HIEs), which affect all program priority areas, including e-prescribing, receipt of lab results, exchange of patient care summaries and public health reporting; nevertheless, the state's efforts also will affect private HIE efforts
    - **HIE progress for safety-net and small practice providers,** especially for disadvantaged patients in program priority areas; nevertheless, the state will also affect all other organizations
    - **Provider-side challenges in e-prescribing and receiving structured lab results, especially for smaller providers (**rather than on pharmacy network and lab challenges)

4.3 Evaluation Methods

4.3.1 STUDY DESIGN

The evaluation framework suggests that the study design should contain several key elements.

- **Qualitative research, with longitudinal data**. The evaluation should obtain qualitative interview data from key informants, given the state's indirect intervention and given emergent developments, since quantitative data will be weak and hard to obtain (if it exists)--that is, it will be challenging to measure quantitatively how public actions affect key processes and outcomes. To make data comparable across organizations and time, we will use a detailed semi-structured interview guide with key informants, at yearly intervals.
- **As much quantitative data as possible.** We will obtain relevant available quantitative data.
- **Special focus areas.** The strength of private HIE efforts, the lagging public HIO and safety-net efforts, and the likely importance of HIOs to safety-net organizations and small practices, as well as for public health objectives, suggests extra (but not exclusive) focus on:
    - **HIE activity in selected regional market areas**. We will obtain information from the HIO and from provider and other organizations in that area. At this point, we have identified seven potentially viable regional HIE efforts that "touch" substantial numbers of stakeholders and patients: Orange County Regional Health Information Organization, Los Angeles Network for Enhances services, EKCITA, Redwood MedNet, Inland Empire Health Information Exchange, San Diego Beacon community, and Health Share Bay Area. We expect to add at least one more regional HIO.

- **Safety-net providers and Medi-Cal HMOs** (and smaller practices/hospitals, to the extent possible), compared to larger private organizations
- **The interaction of public and private HIE efforts**

4.3.2 STUDY POPULATION

- **Cases** will consist of carefully selected organizations:
  - **In each stakeholder category**. We will select organizations whose HIE experiences likely can convey a sense of the status, progress, and challenges of HIE for their stakeholder group; we described stakeholder categories above.
  - **In each major regional HIO market area**. Given the importance of regional HIOs, we will select most cases within a market (HIO) area, including appropriately diverse organizations participating *and* not participating in the HIO.
  - **In other market areas**. Some cases won't fit into the main HIO market areas.
  - **At the state level**. These cases include:
    - Agency, Cal OHII, and DHCS/Medi-Cal
    - California-wide payers, including Kaiser, Anthem, and CalPERs
    - Other organizations (e.g., in a hospital/community health center association)
- **Interviewees** in each case will include the person (executive/manager) in each organization most knowledgeable about HIE.

  We expect to conduct at least 65 interviews per year.

4.3.3 DATA SOURCES AND DATA COLLECTION METHODS

The evaluators will:

- **Use detailed semi-structured interview guides**, based on an already vetted survey guide questions already used with provider organizations.
- **Conduct telephone interviews** of key informants in selected organizations among key stakeholder groups.
- **Repeat interviews** in the same organizations at different points in time
- **Attend webinars** of advisory group and other relevant meetings

- **Summarize key literature** on HIE developments, including ONC directives, HIT Policy Committee statements, peer-reviewed literature, and HIE-related web-sites.
- **Obtain quantitative data**. The evaluators will:
  - Include key statistics that the regional HIE was able to generate
  - Request selected common data across regional HIE (once they're operating)

4.3.4 DATA ANALYSIS

Evaluators will:

- Transcribe recorded interviews
- Summarize interviews in structured summary sheets (one per organization)
- Briefly summarize the organization summaries (one per stakeholder group)
- Summarize findings across stakeholder groups
- Analyze the interviews and their summaries using pattern matching and explanation building techniques. We will identify:
  - Common themes across types of stakeholders
  - Common themes within a stakeholder group
  - Key insights that may not be common themes, by stakeholder group
- Produce presentations and written reports of findings

4.3.5 PRODUCTS AND DISSEMINATION

In the annual evaluation results reports to be submitted to ONC in the 2013 SOP update, and 30 days after the end of the Program, we will submit:

- **Updates or changes to evaluation plan** (if any).
- **Progress on the evaluation** (e.g. we will describe data collection efforts underway) and any issues encountered while conducting the evaluation.
- **Results and interpretation of those results**. Findings will be summarized as briefs (3-5 pages) or in peer-reviewed publications on key topics.
- **Implications of the evaluation findings for program implementation and strategy.**

California's success in implementing HIE hinges on our ability to follow a rigorous privacy and security framework. Following the fair informational practices developed by California's stakeholders, **California is looking to further its development of privacy and security in the various legal frameworks available: statutory, regulatory, contractual, and best practices**. To this end, Agency is coordinating five separate efforts. These are listed below, and described in detail throughout this section. See Appendix B, Templates for Guiding Statewide Privacy and Security Frameworks

1. **Law Harmonization** to simplify the integration of HIPAA and state laws.

2. **Demonstration Projects** to test policies and rules to better inform the State and health care stakeholders while the HIE infrastructure is being defined over the next several years.

3. **Development of contractual language**, policies and procedures, consistent with state and federal laws and best practices, to ensure a trusted environment for HIE.

4. **A Risk Assessment Tool** to enable small providers to conduct their own risk assessments

5. **Facilitating** patient and provider engagement and education.

A timeline, strategy and action plan is forthcoming in an update of this Strategic and Operational Plan that will address gaps in recipient privacy and security policies and practices between the law and current business practice.

5.1 Law Harmonization

Beginning in the second half of 2011, the Privacy and Security Steering Teams began focusing on law harmonization efforts in order to synchronize state law with federal rules pertaining to privacy policies and security standards. The objective is to have legislative activity resulting in law harmonization for the exchange of health information in California.

In October 2011, stakeholders of both the Privacy and the Security Steering Teams unanimously voted to have HIPAA as the base rule for California and to keep California Medical Information Act statutes where there is no equivalent of the law in HIPAA or HITECH. **The two steering teams are neither recommending nor drafting new law, but they are identifying areas where future law harmonization work and drafting new law is needed.** The stakeholders also agreed that the harmonization of the law should be done in a comprehensive manner to be meaningful and operationally feasible.

In 2012, the steering teams focused their work mainly on developing the comprehensive legislative recommendations to CalOHII for the exchange of health information. The legislative proposal for harmonizing California law with federal rules pertaining to the privacy and security of the exchange of health information will take place in several stages, as the changes are layered and substantial, and may require more than one legislative calendar year. The timeline for this effort will most likely extend to California's 2013 – 2015 legislative years.

5.2 Demonstration Projects

Demonstration projects are allowing California to test privacy and security policy that will increase the trust of HIE participants by elevating protection of health information through innovative technology and sound business practices.

On September 23, 2010, Governor Schwarzenegger approved Assembly Bill 278, Health Information Exchange: Demonstration Projects, which authorizes CalOHII to establish and administer demonstration projects for the electronic exchange of health information. **The purpose of these demonstration projects is to evaluate potential solutions to facilitate health information exchange that promotes quality of care, respects the privacy and security of health information, and enhances the trust of the stakeholders.**

The bill authorizes CalOHII to approve up to four demonstration projects annually in order to address barriers to HIE implementation, test potential security and privacy policies, and identify differences between state and federal laws. The demonstration projects enable exchange of electronic health information, while increasing privacy protections, by testing the following:

1. Privacy and security policies and practices
2. New technologies
3. Implementation issues encountered by small health care practitioners

The bill also charges CalOHII with adopting regulations to ensure all demonstration project participants follow a set of rules that frame the project and support objectives. Regulations have been proposed and vetted twice among California health care industry stakeholders and finalized and filed in December 2011 with the Secretary of State for use by the demonstration project participants.

Currently two demonstration projects are approved by CalOHII: San Diego Beacon eHealth Community and Western Health Information Network (WHIN). These two projects will test privacy and security policies as set by the regulations and the demonstration project objectives. CalOHII is testing the patient opt-in consent policy through the San Diego Beacon eHealth Community. The direction of the WHIN demonstration project is to be determined in the near future.

5.3 Ensuring a Trust Environment for HIE

California stakeholders recognize the need for an overall governance structure that encompasses the legal framework for data exchange and standardized terms for data-sharing agreements. The current cost of establishing, negotiating, and maintaining agreements with an increasing number of data exchange partners is seen to be duplicative and expensive. This is felt acutely among smaller exchanges, for which the legal fees may be disproportionately high.

This is a cause for great concern. To remove the current disincentives to exchange, Agency and its partners have begun a set of integrated activities to establish a trust environment for private and secure HIE in California, consistent with current law and best practices. The following activities will facilitate development of a trusted environment:

- California Model Participants Agreements
- Development of policies and procedures to enable direct exchange as a participant in an interstate exchange in the Western States Consortium

Model Agreements

Agency is following a proven process of establishing a set of usable trust agreements. Using a facilitated consensus based process, Agency initiated an iterative process working from straw-man intra- and inter- HIE agreements. These straw-man agreements will be evaluated by a committed group of potential adopters who will review the proposed agreements' language, structure, and proposed processes (for governance and on-going operations) to refine the initial draft agreements into artifacts.

Western States Consortium

In light of the barriers represented by interstate exchange, CeC has led the ongoing progress of the Western States Consortium. This Consortium is an initiative that began in 2011 and has received approval and funding support from the ONC's State Health Policy Consortium Grant in November 2011. The Western States Consortium includes Oregon, California, Nevada, New Mexico, Arizona, Utah, Hawaii, and Alaska.

The Consortium's goal is to develop a common set of policies and technology solutions to ensure trust and security across their exchange community. This will be accomplished by focusing on the policies and procedures regarding issuing the digital certificates used for secure web-based exchange and on linking and sharing their provider directories across states and communities. Combined, these solutions will ensure that all participants can find, know, and trust the identity, credentials, and technical security of those with whom they are exchanging their patients' health data.

A demonstration pilot using Direct messaging and the policies and procedures developed by the Consortium is slated to take place between Oregon and California in late 2012. The project culminates in a set of recommendations and lessons learned on how to improve the work of the consortium, expand it, and offer best practices to be considered by other states considering adoption of similar frameworks.

5.4 HIPAA Security Compliance Tool

In 2011, CalOHII and its Security Steering Team embarked on designing and drafting a HIPAA security compliance tool. This tool was for the use of small, medium, and rural health care providers and entities engaged in health information exchange that may have not performed an adequate security risk assessment or implemented appropriate security measures. The purpose is for these providers to do a self-assessment of their compliance with the federal security standards as they relate to the exchange of health information. This HIPAA security tool will also aid the providers to see if they meet the Meaningful Use Stage I and II security requirements of health information exchange.

The HIPAA security tool was tested during the month of May 2012 for CalOHII stakeholders, and was released for public use on the CalOHII website in June 2012. It can be found at **http://www.ohii.ca.gov/calohi/.**

5.5 Education and Engagement

In a collaborative effort with its stakeholders in 2011, CalOHII developed material and content to educate patients and providers about issues related to privacy and the electronic exchange of health information. As of spring 2012, **this content is now available to the public through a new webpage on the CalOHII website, "Privacy 360."** The website and its content are geared toward educating patients and providers about their rights, role, and responsibilities regarding electronic exchange of information. Another goal of the website is to help patients trust the electronic exchange of health information, electronic health records as used by their health care providers, and to be actively engaged in their own health care.

Conclusion

Fair Information Practices, as interpreted by California's stakeholders can, and has informed the development of laws, regulations, and best practices. As documented in the public comments to the Demonstration regulations, one of the biggest concerns impacting trust is the lack of transparency and accountability of those who have access to individually identifiable health information. What may be considered a common business practice is in fact

unknown to the general public and the regulators who may not have oversight authority over the business associates.

Health information exchange changes the dynamic of one-to-one exchange to the possibility of one-to-many. Consequently, the lack of transparency and adequacy of the accountability in the management of health information in payment and the delivery continuum is a concern that needs to be addressed to ensure trust is maintained. In the HIE Expansion Grants and the demonstration projects, California is performing oversight to ensure that appropriate safeguards are in place to assure that State HIE participants are adhering to legal and policy requirements, including risk mitigation.[20]

[20] [ONC-HIE, PIN 001, July 6, 2010]

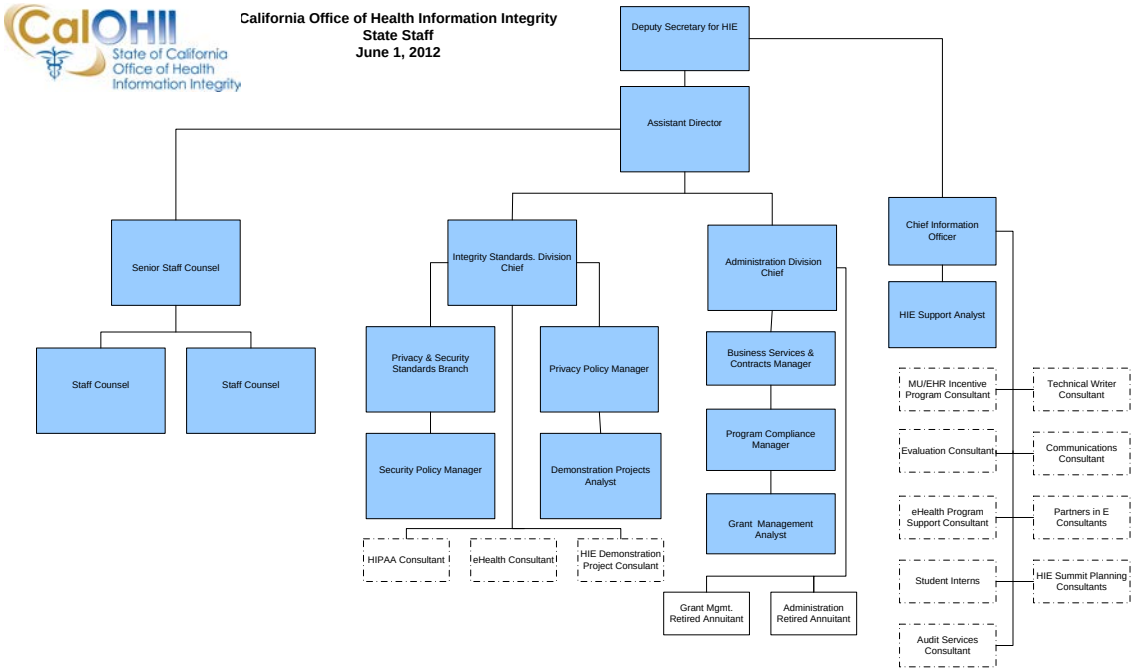
6.1 Staffing Plan

The organizational chart that follows, Figure 24, shows the allocation of personnel and administrative roles spread across the various departments within CalOHII, (California Office of Health Information Integrity) the Agency department responsible for supporting the implementation of HIE and related programs in California. The CalOHII departments are:

- Senior Administration
- Programs
- Privacy & Security
- Administration
- Legal

Since 2010, Agency has persisted in coordinating statewide HIE activities in spite of significant staffing and budget constraints. Most of the positions described on the organizational chart that follows have been filled with qualified employees as of May 2012. Being fully staffed should make a significant difference in the state's ability to provide the leadership and support needed in implementing HIE in California.

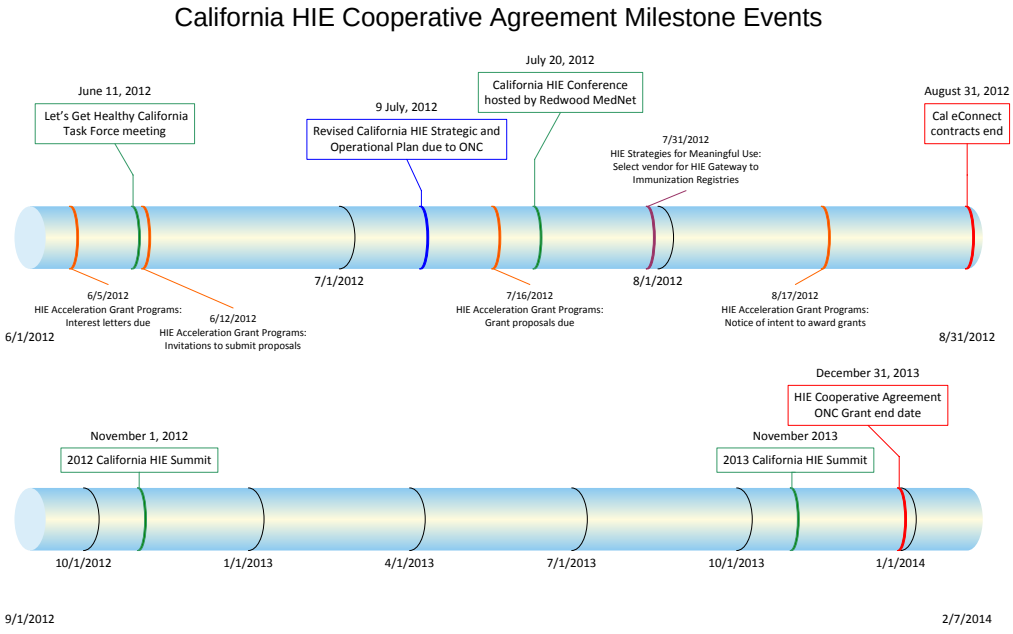
FIGURE 24. STAFFING PLAN



6.2 Major Activities for the Coming Year

Below is a timeline showing some the critical milestones and events identified in the state's plan, from June 2012 to May 2013.

FIGURE 25. CRITICAL MILESTONES FOR CALIFORNIA'S HIE



In conclusion, California will continue to aggressively support and pursue HIE as a statewide effort. We have long recognized the value of HIE to our residents and to the sustaining of safe, quality and affordable care for our population.

The regionalization of HIE efforts in California has allowed for development of differing models of exchange; but there continue to be white spaces and thus there remains room for technical expansion.

Agency will continue to partner wherever opportunities to expand HIE exist – with federal, other state, regional and local partners as well. We know that our Medicaid system is the largest single payer in the state with approximately 7 million enrollees and that California's plans to expand enrollment will bring another 2 million in the near future. The ability to apply the benefits of HIE and the resulting data driven decision management makes HIE critical to the continued care of this population segment.

Agency by closely aligning with the newly named future Partner will focus vision and efforts on

- Medi-Cal,
- foster children, whether enrolled in Medi-Cal or not,
- decision across the care continuum – with a particular focus on long-term care applications,
- providers and hospitals seeking to attain meaningful use incentives
- with the overarching aim of increasing preventive care by engaging consumers in their own care planning and monitoring.

It is through these efforts that we believe we can best reach our newly stated vision and goals:

California's Vision

Improve the health and well-being of all Californians.

California's e-Goals

- *Enhance* individual and population health outcomes through results-oriented programs.

- *Ensure* secure data access that protects patient privacy and data integrity.

- *Engage* patients and families as partners in care.

(a) In the event that the California Health and Human Services Agency applies for and receives federal funds made available through the federal American Recovery and Reinvestment Act of 2009 (Public Law 111-5) for health information technology and exchange, as outlined in subdivision (a) of Section 130251, the California Health Information Technology and Exchange Fund is hereby created in the State Treasury.

(b) All moneys in the California Health Information Technology and Exchange Fund shall be available, upon appropriation by the Legislature, for purposes related to health information technology and exchange.

(c) The California Health Information Technology and Exchange Fund shall consist of, but is not limited to, federal funds made available through ARRA for health information technology and exchange. Notwithstanding Section 16305.7 of the Government Code, any interest and dividends earned on deposits in the fund shall be retained in the fund for purposes of this division.

(d) It is the intent of the Legislature that the activities associated with health information exchange be funded solely through the following:

(1) Federal funds.

(2) Private contributions identified by the state, the state-designated entity, or any relevant advisory panel convened by the California Health and Human Services Agency.

(3) Funds generated by the self-sustaining funding mechanism to be established by the California Health and Human Services Agency or one of its departments, or the state-designated entity.

HIE ARCHITECTURAL MODEL: POINT-TO-POINT DIRECTED EXCHANGE

Domain	Description of approach and where domain is addressed in policies and practices	Description of how stakeholders and the public are made aware of the approach, policies, and practices	Description of gap area and process and timeline for addressing*
Required to address			
Openness and Transparency	Fair Information and Transparency Principles approved by CalPSAB; signed by CHHS Secretary in 2009; incorporated into the regulations of the demonstration projects for the electronic exchange of health information.	Webinars/conference calls open to the public Postings to CalOHII website	N/A
Collection, Use and Disclosure Limitation	CalOHII Privacy and Security Steering Teams addressing through law harmonization.	Webinars/conference calls open to the public Postings to CalOHII website Public forum	2013 - 2014
Safeguards	CalOHII Privacy and Security Steering Teams addressing through law harmonization.	Webinars/conference calls open to the public Postings to CalOHII website	2013 - 2014
Accountability	Fair Information and Transparency Principles approved by CalPSAB; signed by CHHS Secretary in 2009; incorporated into the regulations of the demonstration projects for the electronic exchange of health information. CalOHII Privacy and Security Steering Teams addressing through law harmonization.	Webinars/conference calls open to the public Postings to CalOHII website	N/A
Optional to address			
* If needed, use additional documents to describe and insert reference here.			